Environment Canada
Conservation & Protection

Environnement Canada
Conservation et Protection

Water Chemistry of the Columbia and Pend d'Oreille Rivers near the International Boundary

(DATA REPORT)

S.W.SHEEHAN and M.LAMB
MARCH, 1987

Inland Waters and Lands
Pacific and Yukon Region
Vancouver, B.C.

Water Chemistry of the Columbia and Pend D'Oreille Rivers near the International Boundary

(Data Report)

S.W. Sheehan and M. Lamb

Abstract

During the mid-1970's, concerns were raised about discharges of industrial effluents into the Columbia River. As a result of these concerns, the Water Quality Branch began a study to assess levels of nutrients, metals and other parameters near the international border. From 1978 to 1984 detailed studies of temporal and cross-sectional variability were undertaken. This report presents the data from these studies.

Résumé

Vers le milieu des années 1970's, plusieurs personnes se sont inquiétées des déversements par certaines industries de leurs eaux usées dans la rivière Columbia. En conséquence, la Direction de la qualité des eaux s'est mise à l'oeuvre pour évaluer les niveaux de nutriments, de métaux et d'autres paramètres près de la frontière avec les Etats-Unis. De 1978 à 1984, on a étudié de façon détaillée les variations de ces paramètres avec le temps et sur des coupes transversales de la rivière. Les résultats de cette étude sont présentés ici.

Table of Contents

	Page No.
ABSTRACT	i
RESUME	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	iv
LIST OF FIGURES	viii
ACKNOWLEDGEMENTS	ix
I. Introduction	1
II. Study Sites	2
III. Methods	4
A) Laboratory Analytical Methods	4
B) Field Procedures	4
IV. NAQUADAT Detailed Reports	13
V. Preliminary Studies	16
A) Short Term Variability	16
B) Parameter Selection	16
VI. Cross Section Variability	36
VII. Time series Studies	118
VIII. Other Stations	285
IX. Miscellaneous Studies	309
X. References	312

List of Tables

		Page
Table 1	NAQUADAT Code Numbers and Limits of Detection for the Chemical Parameters Measured in the Columbia and Pend d'Oreille Rivers.	5
Table 2a	Field Sampling Procedures for Chemical Parameters (Hand-Dipped and Pumped Samples).	8
Table 2b	Field Sampling Procedures for Chemical Parameters (Automatic Samplers).	12
Table 3	Filtration Methods Used for Dissolved Phosphorus, Dissolved Metals, and Nitrogen Samples.	13
Table 4a	Variability in phosphorus concentrations (mg/L) in samples collected at different rates and from different depths.	18
Table 4b	Variability in nitrogen concentrations (mg/L) in samples collected at different rates and from different depths.	22
Table 4c	Variability in concentrations (mg/L) of several metals in samples collected at different rates and from different depths.	27
Table 5a	NAQUADAT detailed report of major ions, residues and physical parameters in samples collected from the Columbia River at Waneta on April 30, 1978.	30
Table 5b	NAQUADAT detailed report of major ions, residues, and physical parameters in samples collected from the Pend d'Oreille River on April 30, 1978.	32
Table 6	Concentrations (mg/L) of some elements in water from the Columbia River at Waneta as measured by spark source mass spectrometry.	34
Table 7	Depths (m) of sampling points on the cross section and total depth of the Columbia River at Waneta on each sampling date.	38
Table 8	Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on June 1, 1978.	40

List of Tables (Continued)

		Page
Table 9	Velocity (m/s) measured at each point on the cross section and each depth on June 1, 1978.	41
Table 10	NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on June 1, 1978.	42
Table 11	Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on July 26, 1978.	49
Table 12	Velocity (m/s) measured at each point on the cross section and each depth on July 26, 1978.	50
Table 13	NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on July 26, 1978.	51
Table 14	Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on November 16, 1978.	56
Table 15	Velocity (m/s) measured at each point on the cross section and each depth on November 16, 1978.	57
Table 16	NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on November 16, 1978.	58
Table 17	Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on May 3, 1979.	63
Table 18	Velocity (m/s) measured at each point on the cross section and each depth on May 3, 1979.	64
Table 19	NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on May 3, 1979.	65
Table 20	Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on June 6, 1979.	81
Table 21	Velocity (m/s) measured at each point on the cross section and each depth on June 6, 1979.	82

List of Tables (Continued)

		Page
Table 22	NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on June 6, 1979.	83
Table 23	Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on July 5, 1979.	99
Table 24	Velocity (m/s) measured at each point on the cross section and each depth on July 5, 1979.	100
Table 25	NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on July 5, 1979.	101
Table 26	Parameters Measured During the Five Time Series Studies.	122
Table 27	NAQUADAT detailed report of water quality parameters measured in samples taken at Waneta, September 19 - September 20, 1978.	123
Table 28a	Concentrations (mg/L) of nutrients and fluoride in samples collected at Birchbank, September 17 - September 20, 1979.	127
Table 28b	Concentrations (mg/L) of nutrients and other parameters in samples collected at Waneta, September 17 - September 20, 1979.	143
Table 29	Concentrations of nutrients (mg/L) and fluoride measured at five points on the cross section at Birchbank, September 18, 1979.	154
Table 30a	Concentrations (mg/L) of metals in samples collected at Birchbank, May 12 - May 15, 1981.	155
Table 30b	Concentrations (mg/L) of metals in samples collected at Waneta, May 12 - May 15, 1981.	170
Table 31a	Concentrations (mg/L) of metals in samples collected at Birchbank, October 17, - October 20, 1983.	185
Table 31b	Concentrations (mg/L) of metals in samples collected at Waneta, October 17, - October 20, 1983.	199

List of Tables (Continued)

		Page
Table 32a	Concentrations (usually mg/L) of metals and other parameters in samples collected at Birchbank, March 26 - March 30, 1984.	213
Table 32b	Concentrations (usually mg/L) of metals and other parameters in samples collected at Waneta, March 26 - March 30, 1984.	234
Table 33	NAQUADAT detailed report of major ions, residues, and physical parameters in samples collected during the March, 1984, 94 - hr survey.	257
Table 34	Water quality parameters measured with the Hydrolab during the March, 1984, acid discharge study.	264
Table 35	Concentrations (usually mg/L) of metals and other parameters measured at five points on the cross section at Waneta during the March, 1984, intensive study.	272
Table 36	NAQUADAT detailed report of water quality parameters measured in replicate samples collected from the Columbia River at Birchbank on July, 26, 1978.	286
Table 37	NAQUADAT detailed report of water quality parameters measured in replicate samples collected from the Pend d'Oreille River June, 1978 - March, 1984.	292
Table 38	^{226}Radium counts (pCi/L) measured in water collected from the Columbia River at Waneta and the Pend d'Oreille River on November 16, 1978.	311

List of Figures

		Page
Figure 1	Sampling station locations and NAQUADAT station numbers in the Columbia River Basin, British Columbia.	3
Figure 2	Sampling points on the cross section and depths of samples (m) collected at Waneta on June 1, 1978.	37
Figure 3	Sampling points on the cross section and depths of samples (% of total depth) collected at Waneta July, 1978 - July, 1979.	37

Acknowledgements

The help of all those who contributed to this project is gratefully acknowledged. Dr. Annette Smith under contract to Inland Waters and Lands, produced tables and accompanying text for data which were not handled by the NAQUADAT data base and provided notes for the NAQUADAT printouts.

We are pleased to acknowledge the encouragement and support of Dr. W.E. Erlebach, Chief of the Water Quality Branch and Dr. L.M. Churchland, Head of the Surveys and Interpretation Division, Pacific and Yukon Region throughout all phases of this study.

We thank the personnel from Water Resources Branch, in particular Mr. J. Harris from the Nelson sub-office, who provided the expertise needed to set up a tagline over the Columbia River at Waneta and to measure the flows over the cross-section.

We are grateful to F.T.S. Mah and personnel of the Analytical Services Division, Water Quality Branch, Pacific and Yukon Region for precise and timely data. In particular we thank Ms. P.A. Thompson and Mr. E. Michnowsky of the inorganic section of the laboratory. Their attention to detail including inspection of field procedures was appreciated. Also we express our thanks to Dr. G. Kan for supplying modified glassware to ensure that filtrations for nitrogens were contaminant free.

The information provided by officials of Cominco, the lead-zinc smelter and fertilizer complex, helped us to design field studies. Consultations with Nigel Doyle, Jack McCunn, and Ron Brown and in recent times Graham Kenyon proved to be educational and informative. Additional advice and help from Carl Johnson and Rich Crozier of the Waste Management Branch in Nelson, Dr. Malcolm Clark of the Waste Management Branch in Victoria, and Keith Ferguson and Fred Clagett of Environmental Protection Service in Vancouver was appreciated.

We thank the field staff of Water Quality Branch, in particular Chad Thorp and Jim Taylor, for helping to install tagline supports.

Assistance rendered by other agencies and departments is also appreciated. Environmental Protection Services provided the boat and motor used for the work on the Columbia. The Department of Defense provided storage facilities for the boat and equipment in Trail. Dr. R.W. Durham of Canada Centre for Inland Waters analyzed samples for radium-226, and Dr. Iain Crocker of Atomic Energy of Canada Limited arranged for measurement of trace elements by spark source mass spectrometry.

The following people critically reviewed an earlier draft of this report: Dr. L.M. Churchland, P.H. Whitfield and T.M. Tuominen of the Water Quality Branch, Vancouver and R.E. Kwiatkowski, Water Quality Branch, Inland Waters and Lands, Ottawa.

INTRODUCTION

During the mid-1970's the Water Quality Branch and Environmental Protection Service raised concerns about discharges of industrial effluents into the Columbia River. Data from grab samples and limited surveys conducted by the Water Quality Branch, Inland Waters Directorate, had revealed high nutrient (particularily phosphorus) levels and scattered high concentrations of heavy metals.

In 1978, because of the international importance of the Columbia River and in accordance with its mandate under the Boundary Waters Treaty, the Water Quality Branch began a study with three major objectives.

1. to determine concentrations of nutrients and metals crossing the international border
2. to interpret the nutrient and metal levels with respect to Article IV of the Boundary Waters Treaty
3. in cooperation with Environmental Protection, provide advice to the Province of British Columbia on changes to permits regulating industrial discharges, to the Columbia River

The Columbia is a major international river which arises in the Canadian Rockies and flows across the Canada-United States border near Trail, British Columbia. It is joined in British Columbia by two principal tributaries, the Kootenay River, whose confluence with the Columbia is near Castlegar, B.C. and the Pend d'Oreille, which flows into the Columbia just north of the International Boundary (Figure 1). Discharge of the Columbia River and its tributaries is regulated by four dams built under the Columbia River Treaty and by regulation of Kootenay Lake. The concentrations of chemicals crossing the border are influenced by the rate of discharge of these rivers.

Water quality in the boundary reach of the Columbia is affected by discharges from Westar's pulp and paper mill at Castlegar, the Trail municipal sewage treatment plant, and Cominco Limited's lead-zinc smelter

and fertilizer complex at Trail. Judging from the levels and loads of discharge allowed under permit, it appears that Cominco is the major influence on water quality of the Columbia River downstream of Trail. Initially, high phosphorus levels downstream from Trail suggested that the source was Cominco, whose permit allowed discharge of high concentrations of phosphorus. Subsequent sampling revealed that Cominco was also the major contributor of metals to the river. Therefore, studies were focused on the effects of Cominco discharges on Columbia River water quality.

This report presents data on spatial and temporal variability in Columbia River water quality. It is divided into five sections representing five types of studies.

1. preliminary studies used to identify important parameters and to help to determine appropriate sampling designs
2. studies on the variability of nutrients, metals, and other parameters along a cross section downstream from Trail (the Waneta station, Figure 1)
3. intensive time series studies lasting from 24 to 93 hours and intended to document episodic conditions in the river related to activities at Cominco
4. studies conducted upstream of Trail and in the Pend d'Oreille River to evaluate other influences on the transboundary water quality conditions
5. miscellaneous studies

Analysis of the data presented in this report and the interpretation of the results will be presented in the interpretive report (in prep.).

STUDY SITES

Sampling to determine the quality of water crossing the International Boundary was undertaken at Waneta (NAQUADAT No. 00BC08NE0001), which is located 0.8 km upstream from the border and just above the confluence of

the Columbia and the Pend d'Oreille (Figure 1). Sampling was also undertaken 9 km above Trail at Birchbank (NAQUADAT No. 00BC08NE0005) to represent water quality upstream from Cominco. The contribution of the Pend d'Oreille was evaluated at a station just above its confluence with the Columbia (NAQUADAT No. 00BC08NE0029).

METHODS

Laboratory Analytical Methods

Analytical procedures used in all studies are summarized below. Most water chemistry analyses were performed at the Water Quality Branch Laboratory in Vancouver according to methods described in the NAQUADAT Dictionary (Inland Waters Directorate, Water Quality Branch 1984) and the Analytical Methods Manual (Inland Waters Directorate, Water Quality Branch 1979). Some of the October, 1983, metal analyses were performed at the National Water Quality Laboratory in Burlington, employing the same methods as those used in Vancouver. All analyses used, with their identifying NAQUADAT code numbers and limits of detection are listed in Table 1.

Some metal analyses (eg. total Zn) are listed with two code numbers and two different detection limits. Normally, concentrations of these metals are measured using direct aspiration. When concentrations are below the detection limit of this method, the samples are reanalyzed using solvent extraction.

Field Procedures

Sample bottle preparation and field preservation of samples are summarized in Table 2.

Samples to be analyzed for dissolved phosphorus or dissolved metals were filtered in the field. In the September, 1978, and September, 1979, time

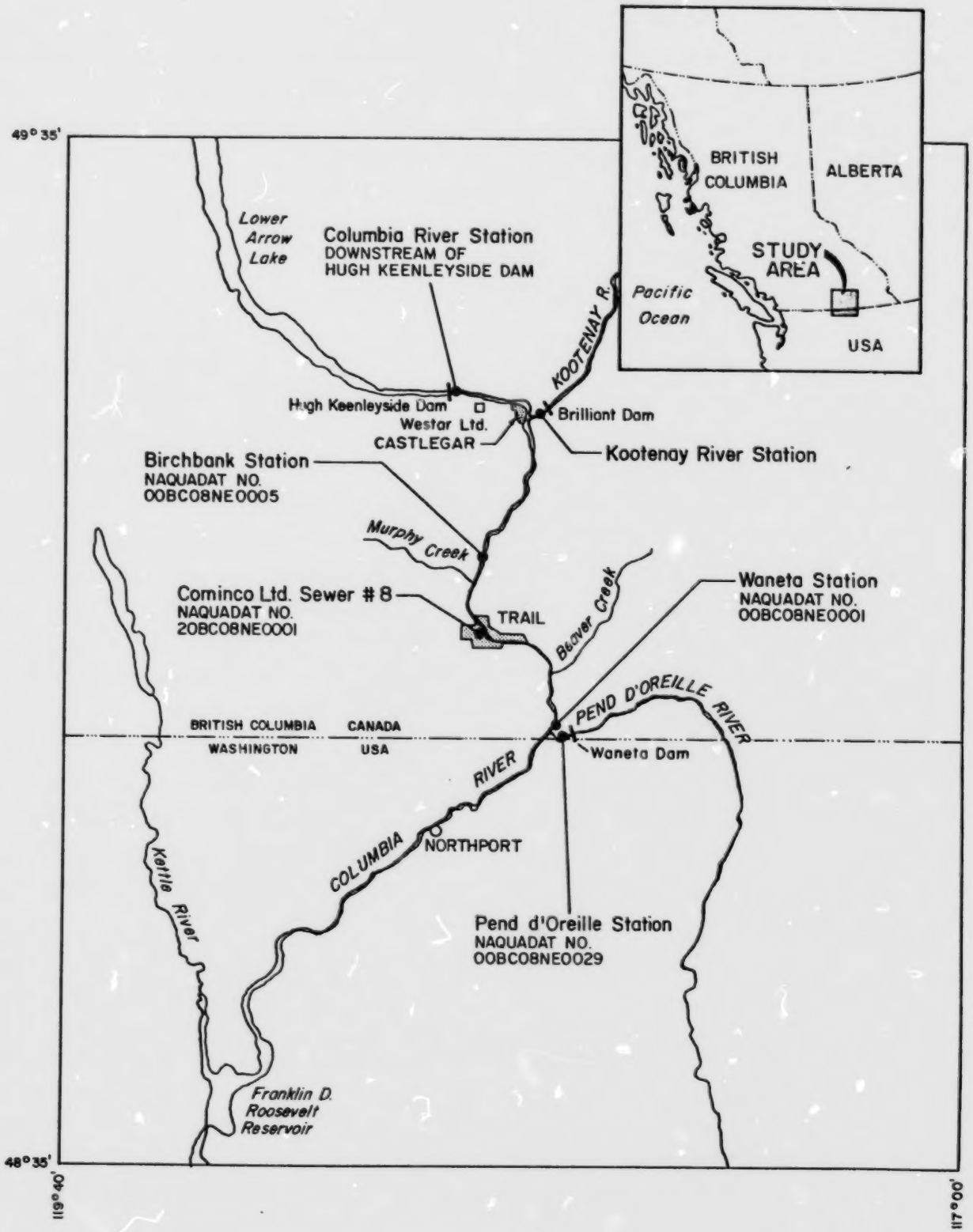

Figure 1 Sampling station locations and NAQUADAT station numbers in the Columbia River Basin, British Columbia

Table 1

Naquadat Code Numbers and Limits of Detection for the Chemical Parameters Measured in the Columbia and Pend d'Oreille Rivers

Parameter	NAQUADAT Number	Detection Limit
Colour	02011	5.0
Specific Conductance	02041	0.2 µ sie/cm
Water Temperature (Lab)	02061 L	
Water Temperature (Field)	02061 S	
Turbidity	02073	0 jtu
Total Organic Carbon	06001	Variable
Total Inorganic Carbon	06051	0.5 mg/L
Cyanide	06606	0.0005 mg/L
Particulate Carbon	06903	Variable
NO_3/NO_2 (dissolved)	07110	0.002 mg/L
Ammonia (dissolved)	07557	0.002 mg/L
Total Dissolved Nitrogen (unfiltered)	07651	0.01 mg/L
Total Dissolved Nitrogen (filtered)	07655	0.01 mg/L
Particulate Nitrogen	07903	Variable
Fluoride (dissolved)	09106	0.050 mg/L
Alkalinity (total)	10101	0.5 mg/L $CaCO_3$
Alkalinity (phenolphthalein)	10151	0.5[1] mg/L $CaCO_3$
Acidity	10251	0.5 mg/L $CaCO_3$
pH (Lab)	10301 L	
Nonfilterable residue	10401	10.0 mg/L
Filterable residue	10451	10.0 mg/L
Nonfilterable residue (fixed)	10501	10.0 mg/L
Filterable residue (fixed)	10551	10.0 mg/L
Hardness (total)	10603	0.5 mg/L $CaCO_3$

[1]This limit of detection applies at pH greater than 8.3. At lower pH phenolphthalein alkalinity = 0

Table 1 (Continued)

Parameter	NAQUADAT Number	Detection Limit
Sodium (dissolved)	11103	0.2 mg/L
Magnesium (dissolved)	12101	Calculated
Silica (reactive)	14105	0.2 mg/L
Phosphorus (dissolved)	15102	0.002 mg/L[2]
Phosphorus (total)	15406	0.002 mg/L[2]
Sulphate (dissolved)	16306	0.5 mg/L
Chloride (dissolved)	17206	0.2 mg/L
Potassium (dissolved)	19103	0.2 mg/L
Calcium (dissolved)	20101	0.5 mg/L
Manganese (total)	25004	0.01 mg/L
Manganese (dissolved)	25104	0.01 mg/L
Manganese (extractable)	25304	0.01 mg/L
Iron (total)	26004	0.05 mg/L
Iron (total)	26005	0.001 mg/L
Iron (dissolved)	26104	0.05 mg/L
Iron (dissolved)	26105	0.001 mg/L
Iron (extractable)	26304	0.05 mg/L
Nickel (total)	28002	0.001 mg/L
Nickel (dissolved)	28102	0.001 mg/L
Nickel (extractable)	28302	0.001 mg/L
Copper (total)	29006	0.01 mg/L
Copper (total)	29005	0.001 mg/L
Copper (dissolved)	29105	0.001 mg/L
Copper (extractable)	29306	0.01 mg/L
Copper (extractable)	29305	0.001 mg/L
Zinc (total)	30004	0.01 mg/L
Zinc (total)	30005	0.001 mg/L
Zinc (dissolved)	30104	0.01 mg/L

Table 1 (Continued)

Parameter	NAQUADAT Number	Detection Limit
Zinc (dissolved)	30105	0.001 mg/L
Zinc (extractable)	30304	0.01 mg/L
Zinc (extractable)	30305	0.001 mg/L
Arsenic (total)	33010	0.0001 mg/L
Arsenic (dissolved)	33104	0.0001 mg/L
Arsenic (extractable)	33304	0.0001 mg/L
Selenium (total)	34010	0.0001 mg/L
Selenium (dissolved)	34102	0.0001 mg/L
Selenium (extractable)	34302	0.0001 mg/L
Silver (total)	47002	0.0005 mg/L
Silver (dissolved)	47102	0.0005 mg/L
Silver (extractable)	47302	0.0005 mg/L
Cadmium (total)	48002	0.0005 mg/L[2]
Cadmium (dissolved)	48102	0.0005 mg/L[2]
Cadmium (extractable)	48302	0.0005 mg/L
Barium (total)	56001	0.1 mg/L
Barium (dissolved)	56101	0.1 mg/L
Antimony (total)	51004	0.001 mg/L
Antimony (dissolved)	51104	0.001 mg/L
Mercury (total)	80011	0.05 µg/L
Mercury (dissolved)	80111	0.05 µg/L
Mercury (extractable)	80311	0.05 µg/L
Lead (total)	82002	0.001 mg/L
Lead (dissolved)	82103	0.001 mg/L
Lead (extractable)	82302	0.001 mg/L

[2] For samples analyzed at the National Water Quality Laboratory, Burlington, a detection limit of 0.001 was used.

Table 2a

Field Sampling Procedures for Chemical Parameters
(Hand-Dipped and Pumped Samples)

Parameter	Field Procedures and Sample Preservation
Total Phosphorus	Samples were collected in or dispensed into 50-ml sovirel glass bottles. The bakelite caps had teflon liner inserts to prevent phosphate contamination. Samples were packed in ice.
Dissolved Phosphorus	Samples were collected in or dispensed into 100-ml sovirel glass bottles capped with teflon-lined bakelite caps. Each sample was filtered through a 47-mm Millipore HA (0.45µm pore diameter) filter which had been pre-soaked in distilled water. The filtering apparatus consisted of a Sartorius polycarbonate filter holder (47mm diameter, Model SM 165 11). The filtrate was collected in a 50-ml sovirel glass bottle and packed in ice.
Nitrate and Nitrite, Ammonia, Total Dissolved Nitrogen (unfiltered)	Samples were collected or dispensed into 250-ml polyethylene bottles and packed in ice.
Nitrate and Nitrite, Ammonia, Total Dissolved Nitrogen, Particulate Carbon, Particulate Nitrogen (Sept. 1978 and Sept. 1979 samples only)	Samples were collected in or dispensed into 1-L polyethylene bottles. Each sample was filtered within 3 hours through a Whatman GF/F glass fibre filter which had been pre-cooked for 6 hours at 460 C. The filtering apparatus consisted of a glass filter holder coupled to a 1-L erlenmeyer flask, both of which had been prewashed in HCl. The filtrate was poured into a 250-ml polyethylene bottle and packed in ice. The filter was transferred to a petri dish and placed in a cooler.
Total Inorganic Carbon/ Total Organic Carbon	Samples were collected in 100-ml polyethylene bottles and packed in ice.
Cyanide	Samples were dispensed into 100-ml polyethylene bottles. Sodium hydroxide pellets were added until pH 12 was exceeded.

Table 2a (Continued)

Parameter	Field Procedures and Sample Preservation
Fluoride and Calcium	Samples were dispensed into 100-ml polyethylene bottles. No preservatives were used. In the laboratory, aliquots were taken for each analysis.
Sulphate	Sample treatment was as described for fluoride and calcium.
Total and Extractable Metals (Cd, Cu, Fe, Mn, Pb, Zn)	Samples were collected in or dispensed into 500-ml polyethylene bottles which had been pre-washed in chromic acid cleaning solution. One millilitre of HNO_3 was added to each bottle no more than 2 hr after collection.
Dissolved Metals (Cd, Cu, Fe, Mn, Ni, Pb, Zn)	Samples were collected in or dispensed into 1-L polyethylene bottles. Each sample was filtered through a Millipore HA filter which had been pre-soaked in 0.25% HNO_3 for a minimum of 12 hours. The filtering apparatus consisted of a glass filter holder coupled to a 1-L erlenmeyer flask, both of which had been pre-washed in HNO_3. The filtrate was collected in a 500-ml polyethylene bottle, and 1-ml of HNO_3 was added. A new filter was used for each sample.
Total and Extractable Metals (As*, Ba, Sb, Se*)	Samples were collected in or dispensed into 100-ml polyethylene bottles which were pre-washed in chromic acid cleaning solution. When analyses for Ba and Sb were desired (June, 1978, samples only), 250-ml bottles were used.
Dissolved Metals (As, Ba, Sb, Se)	Samples were dispensed into 1-L polyethylene bottles. Each was filtered as described for dissolved metals. The filtrate was collected in a 250-ml polyethylene bottle.

* See Major Ions, Residues, Physical Parameters

Table 2a (Continued)

Parameter	Field Procedures and Sample Preservation
Total and Extractable Mercury (Hg)	Samples were collected in or dispensed into 100-ml teflon bottles which had been pre-washed with chromic acid cleaning solution. Two millilitres of preservative (a solution of 50% HNO_3 and 2.5% $K_2Cr_2O_7$) was added to each bottle no more than 2 hr after collection.
Dissolved Mercury (Hg)	Samples were collected in 1-L polyethylene bottles. Each sample was filtered as described for dissolved metals. Two millilitres of preservative (50% HNO_3 and 2.5% $K_2Cr_2O_7$) were added to each bottle no more than 2 hr after collection.
Total and Extractable Silver (Ag)	Samples were dispensed into 100-ml polyethylene bottles. Approximately 0.4g of dry disodium salt EDTA was added to each sample.
Dissolved Silver (Ag)	Samples were dispensed into 1-L polyethylene bottles. Each sample was filtered as described previously for dissolved metals. Approximately 0.4 g of dry disodium salt EDTA was added to each sample.
Major Ions, Residues, Physical Parameters	Two 1-L polyethylene bottles were filled with sample water. In the laboratory, aliquots were taken for analyses. (Aliquots for As and Se analyses were sometimes taken from this bottle.)

Table 2b

Field Sampling Procedures for Chemical Parameters
(Automatic Samplers)

Parameter	Field Procedures and Sample Preservation
Total Phosphorus	Samples were collected in 50-ml sovirel glass bottles. A plywood disc was fitted into the ISCO sampler to hold the 50-ml bottles. Samples were removed every 6-8 hr, capped, and packed in ice.
Nitrate plus Nitrite, Ammonia, Total Dissolved Nitrogen	The centre of the bottle chamber of the ISCO sampler was filled with ice. Samples were collected in 500-ml ISCO bottles. Samples were removed every 6-8 hr, capped, and packed in ice.
Total Metals (Cd, Cr, Cu, Fe, Mn, Pb, Zn)	ISCO sampler: Samples were collected in 500-ml ISCO bottles which had been prewashed in chromic acid cleaning solution. Every 4-6 hrs., the samples were removed; 1 ml of HNO_3 preservative was added, and the bottles were capped. Manning sampler: The samples were collected in 500-ml wedge-shaped polyethylene bottles which had been pre-washed in chromic acid cleaning solution. Samples were removed and preserved as described above.
Extractable Metals (As, Se)	Unpreserved aliquots were poured from the automatic sampler bottles into 100-ml polyethylene bottles.
Extractable Hg	Unpreserved aliquots were poured from the automatic sampler bottles into 100-ml Teflon bottles which had been pre-washed in chromic acid cleaning solution. Two millilitres of preservative (a solution of 50% HNO_3 and 2.5% $K_2Cr_2O_7$) was added to each bottle.

series studies, nitrogen samples were also field-filtered. Pressure for filtration was provided by one of three methods

1. positive pressure supplied by a hand pump
2. vacuum created by a hand pump
3. positive pressure supplied by compressed air (Thorp 1978).

The filtration method used for each study is indicated in Table 3. Further details of the sampling design of each study will be described in the appropriate section.

NAQUADAT DETAILED REPORTS

Several of the tables presented in the following sections are NAQUADAT detailed reports. Some explanation is necessary to help the reader understand these tables.

All data are tabulated under six-character NAQUADAT codes. The first five characters are always numbers and identify the parameter. These code numbers are summarized in Table 1.

When the five-digit code number is followed by an "S" or a "P" (eg. 02011L, 25304P), it indicates that values are for single samples. The five digit code followed by an "R" (eg. 06001R) indicates that the values are means of replicates. Replicate means are always followed by the individual replicate values (eg. 480021 = replicate #1, 480026 = replicate #6, 480020 = replicate #10).

When a mean has been calculated from replicates which include values below detection limits, the mean is preceded by a "Q". Values below detection limits have been set at the detection for these computations.

When the same parameter has been measured by different methods on different dates, all data are listed in one column, and the differences are indicated with back-up codes. For example, iron is measured by

Table 3

Filtration Methods Used for Dissolved Phosphorus, Dissolved Metals, and Nitrogen Samples

Study	Filtration Method			
	Hand Pump Positive Pressure	Hand Pump Vacuum	Compressed Air	None
Short Term Variability	+			
Cross Section Variability				
(6 dates)			+	
Time Series				
September, 1978			+	
September, 1979 (Birchbank)	+			
September, 1979 (Waneta)			+	
May, 1981				+
October, 1983		+		
March, 1984		+		
Other Stations			+	

direct aspiration (26304) or solvent extraction (26305) depending on its concentration.

26304P
Iron
Extractable

.034 05P	(solvent extraction)
.60	(direct aspiration)
.042 05R	(solvent extraction, replicate mean)

All sampling times shown on NAQUADAT reports are recorded as Pacific Standard Time.

Although the detection limit for nonfilterable residues (10401 and 10501) is 10 mg L^{-1} (Table 1), the Vancouver laboratory sometimes reports lower values. Caution is advised in interpreting values below 10 mg L^{-1}.

Section 1

Preliminary Studies

PRELIMINARY STUDIES

Short Term Variability

Initially it was assumed that samples for phosphorus, nitrogen, and metals would be collected. Since collection of a full set of samples from each depth usually took about 10 minutes, it was necessary to know whether significant changes in concentrations of any of these chemicals were likely to occur over periods of 10 minutes or less. If such short term fluctuations were possible, future sampling designs would have to take them into account. Thus, in April, 1978, sampling was conducted at the Waneta and Pend d'Oreille stations to evaluate short term variability (Tables 4a to 4c).

Sampling at Waneta was done from an 18-ft. Boston Whaler anchored approximately 50 m from the left bank of the river. A peristaltic pump was used to collect water from various depths. The samples were taken at intervals of 1.5 m starting from a depth of 7.6 m. At each depth, replicate samples were collected at two frequencies. One set of replicates was collected as quickly as possible; the second set of replicates was collected at intervals of one minute. The number of replicates taken at each depth varied with the parameter. Not all depths were sampled for each parameter.

Samples from the Pend d'Oreille River were collected by wading in from the right bank just upstream from the railway bridge. The samples were taken near the surface by dipping the appropriate collection bottles into the river. Replicate samples were collected in two frequencies, as described for the Waneta samples. However only one depth was sampled (Tables 4a to 4c).

Samples for major ions, residues and physical parameters were collected in conjunction with the short term variability study for selected parameters. One sample was taken for each of five depths at Waneta and for one depth at Pend D'Oreille (Tables 5a to 5c).

For calculations of means and variances of these replicates, values below detection limits were set at half the detection limit.

Parameter Selection

During the April and June, 1978, sampling trips, supplemental samples were collected to help identify chemicals which would require further study. Each sample was a composite taken from five depths. Each sample was stored in a 2-L polyethylene bottle to which 1-ml of concentrated HNO_3 preservative was added. The samples were sent to Atomic Energy of Canada's Chalk River Nuclear Laboratories for analysis by spark source mass spectrometry (Table 6).

Table 4a

Variability in phosphorus concentrations (mg/L) in samples collected at different rates and from different depths. Samples were taken from the Columbia River at Waneta and from the Pend d'Oreille River on April 30, 1978.

Station: Waneta

Depth: 7.6m (83% of total depth)
Time: 1210

	Quick Collection		One Minute Intervals	
	Total Phosphorus	Dissolved Phosphorus	Total Phosphorus	Dissolved Phosphorus
	.083	.057	.073	.057
	.075	.057	.076	.058
	.076	.056	.073	.056
	.079		.072	
	.077		.072	
	.076		.071	
	.073		.074	
Mean	.077	.057	.073	.057
S. D.	.003	.001	.002	.001

Depth: 6.1m (67% of total depth)
Time: 1315

	Quick Collection		One Minute Intervals	
	Total Phosphorus	Dissolved Phosphorus	Total Phosphorus	Dissolved Phosphorus
	.058	.047	.062	.047
	.063	.046	.062	.044
	.068	.047	.066	.047
	.065		.063	
	.065		.065	
	.062		.065	
	.063		.065	
Mean	.063	.047	.064	.046
S. D.	.003	.001	.002	.002

Depth: 4.6m (50% of total depth)
Time: 1400

	Quick Collection		One Minute Intervals	
	Total Phosphorus	Dissolved Phosphorus	Total Phosphorus	Dissolved Phosphorus
	.052	.048	.056	.040
	.053	.049	.055	.040
	.053	.049	.055	.040
	.054		.055	
	.055		.053	
	.052		.054	
	.054			
Mean	.053	.049	.055	.040
S. D.	.001	.001	.001	0

Depth: 3.0m (33% of total depth)
Time: 1445

	Quick Collection		One Minute Intervals	
	Total Phosphorus	Dissolved Phosphorus	Total Phosphorus	Dissolved Phosphorus
	.058	.045	.051	.037
	.058	.044	.052	.038
	.057	.045	.054	.038
	.057		.054	
	.057		.053	
	.058		.054	
	.057		.058	
Mean	.057	.045	.054	.038
S. D.	.0005	.001	.002	.001

Depth: 1.5m (17% of total depth)
Time: 1530

	Quick Collection		One Minute Intervals	
	Total Phosphorus	Dissolved Phosphorus	Total Phosphorus	Dissolved Phosphorus
	.085	.070	.085	.068
	.088	.072	.087	.068
	.084	.074	.085	.068
	.086		.087	
	.085		.086	
	.086		.087	
			.084	
Mean	.086	.072	.086	.068
S. D.	.001	.002	.001	0

Station: Pend d'Oreille River

Depth: Surface
Time: 1830

	Quick Collection		One Minute Intervals	
	Total Phosphorus	Dissolved Phosphorus	Total Phosphorus	Dissolved Phosphorus
	.019	.007	.010	.005
	.019	.007	.011	.005
	.021	.006	.010	.005
	.021		.010	
	.021		.021	
	.020		.022	
	.020			
Mean	.020	.007	.014	.005
S. D.	.001	.001	.006	0

Blanks (May 3, 1978)

Total Phosphorus
.001
.001

Table 4b

Variability in nitrogen concentrations (mg/L) in samples collected at different rates and from different depths. Samples were taken from the Columbia River at Waneta and from the Pend d'Oreille River on April 30, 1978.

Station: Waneta

Depth: 7.6m (83% of total depth)
Time: 1210

	Quick Collection			One Minute Intervals		
	Nitrate + Nitrite	Ammonia	Total Nitrogen	Nitrate + Nitrite	Ammonia	Total Nitrogen
	.14	.041	.30	.098	.030	.19
	.12	.035	.29	.098	.034	.19
	.105	.031	.21	.110	.032	.21
	.096	.031	.19	.095	.028	.18
	.099	.024	.19	.098	.029	.19
	.134	.040	.26	.092	.027	.17
	.123	.031	.22	.115	.049	.27
	.102	.024	.19	.103	.037	.20
	.099	.027	.19	.138	.036	.26
	.101	.035	.22	.125	.035	.19
Mean	.112	.032	.23	.107	.034	.21
S. D.	.016	.006	.042	.015	.006	.033

Depth: 6.1m (67% of total depth)
Time: 1315

	Quick Collection			One Minute Intervals		
	Nitrate + Nitrite	Ammonia	Total Nitrogen	Nitrate + Nitrite	Ammonia	Total Nitrogen
	.19	.046	.33	.16	.032	.28
	.18	.027	.26	.12	.053	.22
	.20	.100	.44	.14	.046	.23
	.15	.012	.22	.30	.049	.42
	.17	.016	.25	.17	.063	.33
	.15	.018	.23	.15	.012	.22
	.15	.004	.21	.29	.054	.39
	.16	.006	.23	.13	.076	.26
	.16	.051	.29	.18	.063	.34
	.18	.038	.29	.22	.028	.31
Mean	.17	.032	.28	.19	.048	.30
S. D.	.018	.029	.069	.064	.019	.071

Depth: 4.6m (50% of total depth)
Time: 1400

	Quick Collection			One Minute Intervals		
	Nitrate + Nitrite	Ammonia	Total Nitrogen	Nitrate + Nitrite	Ammonia	Total Nitrogen
	.093	.025	.17	.104	.033	.22
	.090	.026	.17	.098	.033	.19
	.094	.031	.18	.094	.033	.18
	.091	.026	.17	.095	.029	.19
	.091	.024	.17	.095	.027	.19
	.090	.023	.17	.090	.026	.17
	.091	.026	.17	.102	.040	.20
	.089	.026	.17	.092	.024	.17
	.092	.026	.18	.095	.037	.18
	.091	.030	.18	.096	.036	.18
Mean	.091	.026	.17	.096	.032	.19
S. D.	.001	.002	.005	.004	.005	.015

Depth: 3.0m (33% of total depth)
Time: 1445

	Quick Collection			One Minute Intervals		
	Nitrate + Nitrite	Ammonia	Total Nitrogen	Nitrate + Nitrite	Ammonia	Total Nitrogen
	.14	.009	.19	.14	.028	.23
	.13	.017	.20	.22	.003	.37
	.14	.002	.20	.17	.038	.27
	.18	.012	.24	.23	.006	.28
	.11	.032	.19	.13	.022	.20
	.14	.029	.23	.10	.057	.23
	.15	.005	.20	.15	.016	.22
	.14	<.002	.19	.12	.063	.24
	.14	.003	.19	.14	<.002	.20
	.12	.040	.20	.16	.010	.27
Mean	.14	.015	.20	.16	.024	.25
S. D.	.019	.014	.018	.041	.022	.050

Depth: 1.5m (17% of total depth)
Time: 1530

	Quick Collection			One Minute Intervals		
	Nitrate + Nitrite	Ammonia	Total Nitrogen	Nitrate + Nitrite	Ammonia	Total Nitrogen
	.090	.027	.17	.096	.031	.18
	.095	.036	.18	.103	.039	.22
	.089	.028	.17	.094	.027	.19
	.112	.031	.25	.095	.030	.18
	.102	.022	.25	.095	.032	.19
	.092	.026	.18	.10	.035	.21
	.092	.028	.19	.095	.034	.18
	.089	.026	.17	.103	.019	.23
	.103	.026	.25	.095	.029	.18
	.113	.008	.44	.096	.027	.19
Mean	.098	.026	.23	.097	.030	.20
S. D.	.009	.007	.083	.003	.005	.018

Station: Pend d'Oreille River

Depth: Surface
Time: 1830

	Quick Collection			One Minute Intervals		
	Nitrate + Nitrite	Ammonia	Total Nitrogen	Nitrate + Nitrite	Ammonia	Total Nitrogen
	.024	.019	.13	.024	.019	.16
	.033	.036	.22	.020	.015	.12
	.020	.013	.12	.022	.013	.12
	.019	.013	.11	.024	.016	.12
	.020	.014	.12	.032	.028	.18
	.024	.021	.13	.021	.017	.11
	.020	.015	.12	.023	.020	.12
	.023	.013	.15	.026	.026	.17
	.032	.024	.20	.022	.020	.13
	.021	.018	.12	.030	.023	.15
Mean	.024	.019	.14	.024	.020	.14
S. D.	.005	.007	.038	.004	.005	.025

Blanks (May 3, 1978)

Nitrate + Nitrite	Ammonia	Total Nitrogen
.003	.003	<.05
<.002	<.002	<.05
<.002	.002	<.05

Table 4c

Variability in concentrations (mg/L) of several metals in samples collected at different rates and from different depths. Samples were taken from the Columbia River at Waneta and from the Pend d'Oreille River on April 30, 1978.

Station: Waneta

Depth: 7.6m (83% of total depth)
Time: 1210

	Quick Collection							One Minute Intervals						
	Total Cd	Total Cu	Total Fe	Total Mn	Total Ni	Total Pb	Total Zn	Total Cd	Total Cu	Total Fe	Total Mn	Total Ni	Total Pb	Total Zn
	.0006	.002	.22	.02	<.001	.008	.05	.0023	.002	.23	.02	.001	.005	.05
	.0007	.002	.25	.02	.003	.007	.06	.0006	.002	.23	.02	<.001	.005	.05
	<.0005	.002	.38	.02	<.001	.006	.05	.0007	.002	.25	.02	<.001	.006	.05
	<.0005	.002	.27	.02	.001	.005	.05	<.0005	.003	.33	.02	<.001	.006	.06
	<.0005	.002	.34	.02	.001	.007	.06	.0006	.002	.26	.02	<.001	.006	.06
	<.0005	.002	.33	.02	<.001	.006	.06	.0006	.003	.23	.02	.009	.006	.06
	<.0005	.002	.25	.02	<.001	.005	.05	.0006	.003	.45	.02	.001	.006	.07
	<.0005	.002	.26	.02	.044	.005	.05	<.0005	.003	.30	.02	.074	.004	.06
	<.0005	.002	.38	.02	<.001	.005	.05	.0006	.002	.11	.01	<.001	.008	.04
	<.0005	.002	.23	.02	<.001	.005	.05	<.0005	.002	.11	.01	<.001	.005	.05
Mean	<.0005	.002	.29	.02	.005	.006	.05	.0007	.002	.25	.02	.009	.006	.06
S. D.	.0003	0	.061	0	.014	.001	.005	.0006	.001	.100	.004	.023	.001	.009

Depth: 4.6m (50% of total depth)
Time: 1400

	Quick Collection							One Minute Intervals						
	Total Cd	Total Cu	Total Fe	Total Mn	Total Ni	Total Pb	Total Zn	Total Cd	Total Cu	Total Fe	Total Mn	Total Ni	Total Pb	Total Zn
	<.0005	<.001	.25	.02	<.001	.003	.04	<.0005	.001	.22	.02	.001	.005	.04
	<.0005	.003	.25	.01	<.001	.005	.04	<.0005	.002	.26	.02	<.001	.005	.04
	<.0005	.004	.33	.02	<.001	.005	.05	<.0005	.001	.25	.02	<.001	.004	.04
	<.0005	.001	.24	.02	<.001	.005	.04	<.0005	.002	.19	.02	.02	.006	.04
	<.0005	.001	.22	.01	<.001	.005	.04	<.0005	<.001	.25	.01	<.001	.004	.04
	<.0005	<.001	.20	.01	<.001	.005	.03	<.0005	<.001	.27	.01	<.001	.005	.04
	<.0005	.003	.23	.01	<.001	.006	.04	<.0005	<.001	.30	.02	<.001	.005	.05
	<.0005	.001	.23	.02	<.001	.005	.04	<.0005	.001	.19	.01	<.001	.004	.04
	.0011	.001	.22	.02	.001	.004	.04	<.0005	.001	.23	.02	.001	.005	.05
	<.0005	.002	.23	.02	.002	.005	.04	<.0005	.001	.22	.02	.001	.004	.05
Mean	<.0005	.002	.24	.02	<.001	.005	.04	<.0005	.001	.24	.02	.002	.005	.04
S. D.	.0003	.001	.035	.005	.001	.001	.005	0	.001	.035	.005	.006	.001	.005

Depth: 1.5m (17% of total depth)
Time: 1530

	Quick Collection							One Minute Intervals						
	Total Cd	Total Cu	Total Fe	Total Mn	Total Ni	Total Pb	Total Zn	Total Cd	Total Cu	Total Fe	Total Mn	Total Ni	Total Pb	Total Zn
	.0005	.002	.13	.02	.001	.008	.05	.0005	.002	.13	.02	<.001	.005	.04
	.0005	.001	.62	.02	<.001	.007	.05	.0005	.002	.17	.02	<.001	.005	.04
	.0005	.001	.15	.02	<.001	.007	.05	.0005	.003	.10	.02	<.001	.007	.04
	.0005	.003	.17	.02	.001	.008	.05	.0005	.002	.08	.02	.001	.006	.05
	.0010	.001	.14	.02	<.001	.007	.05	.0005	.002	.14	.02	.001	.006	.05
	.0005	.003	.15	.02	<.001	.008	.05	.0010	.009	.13	.02	.001	.008	.05
	.0005	.001	.13	.02	<.001	.007	.05	.0005	.004	.21	.02	.001	.007	.05
	.0005	.001	.15	.02	<.001	.007	.05	.0010	.003	.20	.02	.002	.007	.05
	.0005	.002	.26	.02	<.001	.007	.04	.0005	.002	.19	.02	<.001	.006	.04
	.0005	.002	.19	.02	<.001	.008	.05	.0010	.004	.22	.02	<.001	.007	.05
Mean	.0006	.002	.21	.02	<.001	.007	.05	.0007	.003	.16	.02	.001	.006	.05
S. D.	.0001	.001	.149	0	.0005	.0005	.003	.0002	.002	.048	0	.001	.001	.005

Station: Pend d'Oreille River

Depth: Surface
Time: 1830

	Quick Collection							One Minute Intervals						
	Total Cd	Total Cu	Total Fe	Total Mn	Total Ni	Total Pb	Total Zn	Total Cd	Total Cu	Total Fe	Total Mn	Total Ni	Total Pb	Total Zn
	<.0005	.004	.07	<.01	<.001	.003	.006	<.0005	.002	.10	.01	<.001	.002	.005
	<.0005	.002	.09	.01	<.001	.002	.007	<.0005	.002	.11	.01	<.001	.002	.015
	<.0005	.002	.08	.01	<.001	.002	.008	<.0005	.002	.06	.01	<.001	.003	.009
	<.0005	.003	.11	.01	<.001	.002	.022	<.0005	.003	.09	.01	<.001	.003	.009
	<.0005	.002	.08	.01	<.001	.003	.009	<.0005	.003	.10	.01	<.001	.003	.009
	<.0005	.002	.08	.01	<.001	.003	.005	<.0005	.002	.13	.01	<.001	.002	.006
	<.0005	.006	.07	.01	<.001	.003	.008	<.0005	.002	.14	.01	<.001	.003	.024
	<.0005	.003	.17	.01	<.001	.003	.006	<.0005	.001	.12	.01	<.001	<.001	.001
	<.0005	.002	.09	<.01	<.001	.003	.008	<.0005	.003	.13	.01	<.001	.002	.006
	<.0005	.003	.10	.01	<.001	.002	.007	<.0005	.002	.17	.01	<.001	.002	.002
Mean	<.0005	.003	.09	.01	<.001	.003	.009	<.0005	.002	.12	.01	<.001	.002	.009
S. D.	0	.001	.029	.004	0	.0005	.005	0	.001	.035	.003	0	.001	.007

Table 5a

NAQUADAT detailed report of major ions, residues and physical parameters in samples collected from the Columbia River at Waneta on April 30, 1978.

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0001 LAT. 49D 1M 39S LONG. 117D 36M 11S
COLUMBIA RIVER BELOW TRAIL, 1.8 KM NORTH OF WANETA POWER DAM, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	97265F SAMPLING DEPTH PERCENT OF TOTAL DEPTH %	02011L COLOUR APPARENT REL. UNITS	02041L SPECIFIC CONDUCT. USIE/CM	02041S SPECIFIC CONDUCT. USIE/CM	02061L TEMP. WATER DEG.C.	02061S TEMP. WATER DEG.C.	02073L TURBIDITY JTU	09106L FLUORIDE DISSOLVED F MG/L
78-04-30	1310	324	83.	10.	139.0	140.0	20.1	--	1.3	.219
	1415	324	67.	5.	138.0	--	20.0	--	1.0	.218
	1500	324	50.	5.	138.0	140.0	19.9	8.0	1.1	.208
	1545	324	33.	10.	138.0	--	19.8	8.0	1.1	.202
	1630	324	17.	5.	138.0	140.0	19.8	9.0	1.1	.202

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10101L ALKALINITY TOTAL CACO3 MG/L	10151L ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	10301L PH PH UNITS	10301S PH PH UNITS	10401L RESIDUE NONFILTR. MG/L	10451L RESIDUE FILTERABLE MG/L	10501L RESIDUE FIXED NONFILTR. MG/L	10551L RESIDUE FIXED FILTERABLE MG/L
78-04-30	1310	324	50.7	.0	7.7	8.0	4.	88.	2.	61.
	1415	324	50.6	.0	7.8	--	3.	92.	L1.	68.
	1500	324	50.6	.0	7.7	7.8	5.	87.	3.	55.
	1545	324	50.9	.0	7.7	--	4.	85.	1.	65.
	1630	324	50.6	.0	7.7	7.6	4.	91.	3.	66.

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10603L HARDNESS TOTAL CACO3 MG/L	11103L SODIUM DISSOLVED NA MG/L	12101L MAGNESIUM DISSOLVED (CALCD.) MG MG/L	14105L SILICA REACTIVE SIO2 MG/L	16306L SULPHATE DISSOLVED SO4 MG/L	17206L CHLORIDE DISSOLVED CL MG/L	19103L POTASSIUM DISSOLVED K MG/L	20101L CALCIUM DISSOLVED CA MG/L
78-04-30	1310	324	64.2	1.4	4.0	4.8	16.2	.9	.8	19.1
	1415	324	65.0	1.4	3.6	4.7	16.3	.9	.7	20.1
	1500	324	64.0	1.4	2.5	4.8	16.1	.9	.7	21.6
	1545	324	64.6	1.4	3.6	4.9	16.1	.9	.6	19.9
	1630	324	64.6	1.4	3.5	4.9	16.4	1.0	.7	20.1

FOOTNOTE: L - LESS THAN DETECTION LIMIT G - GREATER THAN MEASUREMENT LIMIT
NOTEZ BIEN: L - PLUS PETIT QUE LA LIMITE DE DETECTION G - PLUS GRAND QUE LA LIMITE MESURE

Table 5b

NAQUADAT detail report of major ions, residues, and physical parameters in samples collected from the Pend d'Oreille River on April 30, 1978.

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029 LAT. 49D 0M 11S LONG. 117D 37M 0S
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	02011L COLOUR APPARENT REL. UNITS	02041L SPECIFIC CONDUCT. USIE/CM	02041S SPECIFIC CONDUCT. USIE/CM	02061L TEMP. WATER DEG.C.	02061S TEMP. WATER DEG.C.	02073L TURBIDITY JTU	09106L FLUORIDE DISSOLVED F MG/L
78-04-30	1930	324	10.	143.0	100.0	19.4	9.0	2.6	.083

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10101L ALKALINITY TOTAL CACO3 MG/L	10151L ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	10301L PH PH UNITS	10301S PH PH UNITS	10401L RESIDUE NONFILTR. MG/L	10451L RESIDUE FILTERABLE MG/L	10501L RESIDUE FIXED NONFILTR. MG/L	10551L RESIDUE FIXED FILTERABLE MG/L
78-04-30	1930	324	64.0	.0	8.0	8.1	8.	88.	6.	58.

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10603L HARDNESS TOTAL CACO3 MG/L	11103L SODIUM DISSOLVED NA MG/L	12101L MAGNESIUM DISSOLVED (CALCD.) MG MG/L	14105L SILICA REACTIVE SIO2 MG/L	16306L SULPHATE DISSOLVED SO4 MG/L	17206L CHLORIDE DISSOLVED CL MG/L	19103L POTASSIUM DISSOLVED K MG/L	20101L CALCIUM DISSOLVED CA MG/L
78-04-30	1930	324	66.8	2.6	4.6	7.4	9.2	.8	.8	19.1

FOOTNOTE: L - LESS THAN DETECTION LIMIT G - GREATER THAN MEASUREMENT LIMIT
NOTEZ BIEN: L - PLUS PETIT QUE LA LIMITE DE DETECTION G - PLUS GRAND QUE LA LIMITE MESURE

Table 6

Concentrations (mg/L) of some elements in water from the Columbia River at Waneta as measured by spark source mass spectrometry.

Element	Concentration in April 30, 1978 Sample	Concentration in June 1, 1978 Sample
Bromine	.0023	.003
Calcium	26.2	8.8
Chlorine	.06	.03
Fluorine	7.7	.003
Magnesium	3.4	2.4
Phosphorus	.04	.02
Potassium	.17	.09
Silicon	1.2	.65
Sodium	.58	.36
Sulphur	4.1	1.9
Aluminum	.14	.03
Barium	.012	.0099
Chromium	.0028	.004
Cobalt	.0026	.002
Copper	.017	.01
Iron	.22	.06
Manganese	.011	.004
Nickel	.0039	.003
Scandium	.0008	.0009
Strontium	.032	.039
Vanadium	.0006	.001
Zinc	.038	.027

Section 2

Cross Section Variability

CROSS SECTION VARIABILITY

Measurements were taken from a cross section at Waneta to determine if the river was well mixed at that site. If the cross section proved homogeneous, future sampling could be simplified: one point near the bank could represent water quality of the whole cross section. To establish homogeneity at different discharge rates, measurements were made six times between June, 1978 and July, 1979.

Sampling points were established by using a tag line strung across the river. A permanent pole was mounted in a cement-filled hole on the left bank. A cable marked at 10 m intervals was strung from the pole to the right bank. Samples were collected from a boat at predetermined distances along the cross section (see below). The bow line of the boat was attached to a traveller positioned on a cable. The traveller was secured to hold the boat over each sampling point.

For the initial study in June, 1978, samples were taken at nine points on the cross section and at two depths (20% and 80% of the total river depth) at each point. Locations and absolute depths of the sampling points are illustrated in Figure 2. For the remaining studies (July, 1978 - July, 1979) samples were taken at six points and three depths (Figure 3).

Because sampling the entire cross section took several hours, it was not possible to determine whether differences among points were due to spatial or temporal variability. Thus, in 1979 a sampling point on the left bank was added. This point was sampled every half hour as the cross section was being sampled to account for the temporal factor.

Samples were collected with a peristaltic pump. Samples for nutrients and heavy metals were taken at every point and depth. Samples for major ions, residues and physical parameters were collected at some points.

River velocity and discharge rate were determined at each point as described by Terzi (1981).

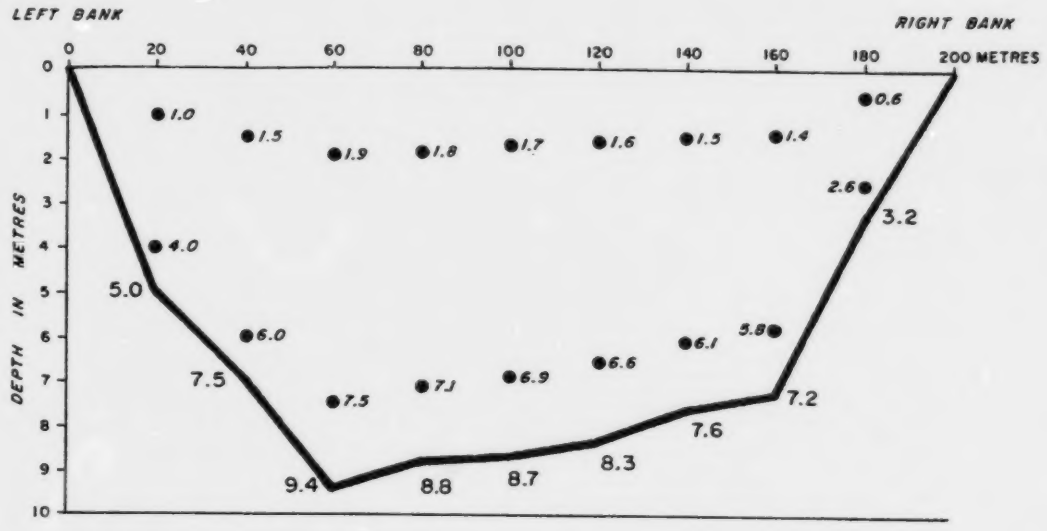

FIGURE 2 Sampling points on the cross section and depths of samples (m) collected at Waneta on June 1,1978. Measurements were taken at 20% and 80% of river depth. The total depth of the river at each sampling point is also shown.

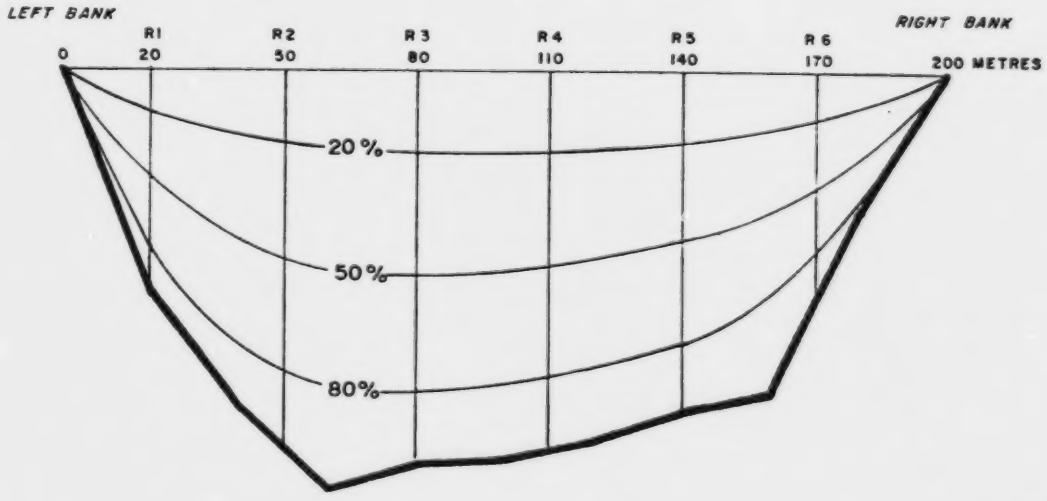

FIGURE 3. Sampling points on the cross section and depths of samples (% of total depth) collected at Waneta July, 1978 — July, 1979. Refer to Table 7 for absolute depths of sampling sites on each date.

Table 7

Depths (m) of sampling points on the cross section and total depth of the Columbia River at Waneta on each sampling date.

Date: July 26, 1978

Percent of Total Depth	Meters from Left Bank 20	50	80	110	140	170
20	1.1	1.6	1.5	1.4	1.2	.4
50	2.7	4.1	3.7	3.5	3.0	1.1
80	4.2	6.5	5.9	5.7	4.8	1.7
Total Depth	5.3	8.2	7.3	7.1	6.0	2.1

Date: November 16, 1978

Percent of Total Depth	Meters from Left Bank 20	50	80	110	140	170
20	.9	1.5	1.4	1.3	1.1	.3
50	2.3	3.7	3.4	3.2	2.7	.8
80	3.7	6.0	5.5	5.1	4.3	1.2
Total Depth	4.7	7.5	6.9	6.4	5.4	1.5

Date: May 3, 1979

Percent of Total Depth	Meters from Left Bank 20	50	80	110	140	170
20	1.0	1.6	1.4	1.3	1.2	.5
50	2.6	3.9	3.5	3.4	2.9	1.2
80	4.0	6.2	5.7	5.4	4.7	1.8
Total Depth	5.1	7.7	7.1	6.8	5.8	2.3

Date: June 6, 1979

Percent of Total Depth	Meters from Left Bank					
	20	50	80	110	140	170
20	1.2	1.8	1.6	1.6	1.4	.7
50	3.0	4.5	4.1	3.9	3.4	1.8
80	4.8	7.1	6.6	6.2	5.5	2.9
Total Depth	6.0	8.9	8.2	7.8	6.8	3.6

Date: July 5, 1979

Percent of Total Depth	Meters from Left Bank					
	20	50	80	110	140	170
20	.8	1.4	1.3	1.2	1.0	.4
50	2.0	3.5	3.2	3.0	2.5	1.0
80	3.1	5.6	5.5	4.8	4.0	1.6
Total Depth	3.9	7.0	6.4	6.0	5.0	2.0

Table 8

Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on June 1, 1978.

Distance from Left Bank (m)	Velocity (Mean in Vertical)	Discharge
10	.15	3.91
20	.62	43.50
30	.96	62.37
40	1.22	91.35
50	1.38	125.14
60	1.79	167.28
70	1.94	177.92
80	2.08	183.55
90	2.21	192.10
100	2.01	174.89
110	1.93	162.13
120	1.98	163.04
130	1.92	153.87
140	1.91	144.98
150	1.70	121.97
160	1.70	122.71
170	1.42	92.77
180	1.09	35.23
	Total	2218.66

Table 9

Velocity (m/s) measured at each point on the cross section and each depth on June 1, 1978.

Distance from Left Bank (m)	Velocity Measured at 20% of Total Depth	80%
10	-	-
20	1.21	.52
30	1.36	.56
40	1.53	.91
50	1.70	1.07
60	1.96	1.62
70	1.62	2.26
80	2.37	1.79
90	2.43	2.00
100	2.29	1.74
110	2.24	1.62
120	2.22	1.74
130	2.12	1.72
140	2.12	1.70
150	1.96	1.44
160	1.92	1.48
170	1.70	1.13
180	1.30	.88

Table 10

NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on June 1, 1978. Concentrations of most substances are expressed in mg/L.

POINTS ON THE CROSS SECTION

	% DEPTH	R1	R2	R3	R4	R5	R6	R7	R8	R9
SAMPLING	.8	1430	1450	1510	1530	1550	1610	1630	1650	1750
TIMES:	.2	1440	1500	1520	1540	1600	1620	1640	1700	1800
PARAMETER: 02011L - COLOUR APPARENT - REL. UNITS										
	.2	--	--	--	L5.	--	L5.	--	--	--
	.8	--	--	--	L5.	--	L5.	--	--	--
PARAMETER: 02041L - SPECIFIC CONDUCT. - USIE/CM										
	.2	--	--	--	138.0	--	138.0	--	--	--
	.8	--	--	--	139.0	--	138.0	--	--	--
PARAMETER: 02061L - TEMP. WATER - DEG.C.										
	.2	--	--	--	21.1	--	21.0	--	--	--
	.8	--	--	--	21.0	--	21.0	--	--	--
PARAMETER: 02073L - TURBIDITY - JTU										
	.2	--	--	--	.95	--	.96	--	--	--
	.8	--	--	--	.97	--	.96	--	--	--
PARAMETER: 06001L - CARBON TOTAL ORGANIC - MG/L										
	.2	7.4	7.4	5.5	6.1	6.1	9.1	7.3	8.4	8.0
	.8	7.4	6.8	6.4	7.4	7.1	8.7	7.7	7.7	8.0
PARAMETER: 06051L - CARBON TOTAL INORGANIC - MG/L										
	.2	12.0	12.0	13.0	13.0	13.0	11.0	11.0	10.0	12.0
	.8	12.0	13.0	13.0	12.0	13.0	11.0	11.0	11.0	11.0
PARAMETER: 07110L - NITROGEN DISSOLVED NO3 & NO2 - MG/L										
	.2	.062	.063	.067	.063	.064	.063	.061	.062	.061
	.8	.062	.063	.063	.064	.063	.062	.063	.062	.062
PARAMETER: 07557L - NITROGEN DISSOLVED AMMONIA - MG/L										
	.2	.035	.037	.034	.036	.034	.031	.027	.025	.024
	.8	.036	.037	.037	.036	.034	.031	.031	.025	.024
PARAMETER: 07651L - NITROGEN DISSOLVED - MG/L										
	.2	.17	.16	.16	.15	.16	.14	.14	.14	.14
	.8	.21	.16	.16	.15	.15	.15	.16	.14	.15

POINTS ON THE CROSS SECTION

SAMPLING TIMES:	% DEPTH	R1	R2	R3	R4	R5	R6	R7	R8	R9
	.8	1430	1450	1510	1530	1550	1610	1630	1650	1750
	.2	1440	1500	1520	1540	1600	1620	1640	1700	1800
PARAMETER: 09106L - FLUORIDE DISSOLVED - MG/L										
	.2	--	--	--	.150	--	.150	--	--	--
	.8	--	--	--	.149	--	.155	--	--	--
PARAMETER: 10101L - ALKALINITY TOTAL - MG/L										
	.2	--	--	--	55.2	--	55.4	--	--	--
	.8	--	--	--	55.2	--	55.4	--	--	--
PARAMETER: 10151L - ALKALINITY PHENOL PHTHALEIN - MG/L										
	.2	--	--	--	.0	--	.0	--	--	--
	.8	--	--	--	.0	--	.0	--	--	--
PARAMETER: 10301L - PH - PH UNITS										
	.2	--	--	--	7.7	--	7.7	--	--	--
	.8	--	--	--	7.7	--	7.8	--	--	--
PARAMETER: 10401L - RESIDUE NONFILTR. - MG/L										
	.2	--	--	--	2.	--	3.	--	--	--
	.8	--	--	--	3.	--	6.	--	--	--
PARAMETER: 10451L - RESIDUE FILTERABLE - MG/L										
	.2	--	--	--	88.	--	87.	--	--	--
	.8	--	--	--	98.	--	84.	--	--	--
PARAMETER: 10501L - RESIDUE FIXED NONFILTR. - MG/L										
	.2	--	--	--	1.	--	2.	--	--	--
	.8	--	--	--	2.	--	L1.	--	--	--
PARAMETER: 10551L - RESIDUE FIXED FILTERABLE - MG/L										
	.2	--	--	--	60.	--	63.	--	--	--
	.8	--	--	--	78.	--	67.	--	--	--
PARAMETER: 10603L - HARDNESS TOTAL - MG/L										
	.2	--	--	--	66.7	--	66.5	--	--	--
	.8	--	--	--	66.5	--	66.4	--	--	--
PARAMETER: 11103L - SODIUM DISSOLVED - MG/L										
	.2	--	--	--	1.5	--	1.5	--	--	--
	.8	--	--	--	1.5	--	1.5	--	--	--

POINTS ON THE CROSS SECTION

SAMPLING TIMES:	% DEPTH	R1	R2	R3	R4	R5	R6	R7	R8	R9
	.8	1430	1450	1510	1530	1550	1610	1630	1650	1750
	.2	1440	1500	1520	1540	1600	1620	1640	1700	1800
PARAMETER: 12101L - MAGNESIUM DISSOLVED (CALCD.) - MG/L										
	.2	--	--	--	4.0	--	3.7	--	--	--
	.8	--	--	--	4.0	--	3.5	--	--	--
PARAMETER: 14105L - SILICA REACTIVE - MG/L										
	.2	--	--	--	4.7	--	4.8	--	--	--
	.8	--	--	--	4.6	--	4.7	--	--	--
PARAMETER: 15102L - PHOSPHORUS TOTAL DISSOLVED - MG/L										
	.2	.017	.013	.014	.011	.016	.019	.017	.015	.015
	.8	.016	.023	.013	.012	.017	.018	.017	.016	.015
PARAMETER: 15406L - PHOSPHORUS TOTAL - MG/L										
	.2	.027	.026	.025	.024	.028	.028	.027	.026	.026
	.8	.032	.037	.034	.025	.027	.028	.028	.027	.028
PARAMETER: 16306L - SULPHATE DISSOLVED - MG/L										
	.2	--	--	--	13.6	--	14.4	--	--	--
	.8	--	--	--	13.9	--	--	--	--	--
PARAMETER: 17206L - CHLORIDE DISSOLVED - MG/L										
	.2	--	--	--	.9	--	.8	--	--	--
	.8	--	--	--	.8	--	.9	--	--	--
PARAMETER: 19103L - POTASSIUM DISSOLVED - MG/L										
	.2	--	--	--	.6	--	.6	--	--	--
	.8	--	--	--	.7	--	.6	--	--	--
PARAMETER: 20101L - CALCIUM DISSOLVED - MG/L										
	.2	--	--	--	20.2	--	20.6	--	--	--
	.8	--	--	--	20.0	--	20.8	--	--	--
PARAMETER: 25004P - MANGANESE TOTAL - MG/L										
	.2	L.01	L.01	.01	L.01	L.01	.01	L.01	L.01	L.01
	.8	L.01	.02	.01	L.01	L.01	L.01	L.01	L.01	L.01
PARAMETER: 25104P - MANGANESE DISSOLVED - MG/L										
	.2	L.01	L.01	L.01	L.01	L.01	L.01	L.01	L.01	L.01
	.8	L.01	L.01	L.01	L.01	L.01	L.01	L.01	L.01	L.01

POINTS ON THE CROSS SECTION

SAMPLING TIMES:	% DEPTH	R1	R2	R3	R4	R5	R6	R7	R8	R9
	.8	1430	1450	1510	1530	1550	1610	1630	1650	1750
	.2	1440	1500	1520	1540	1600	1620	1640	1700	1800
PARAMETER: 25304P - MANGANESE EXTRBLE. - MG/L										
	.2	.01	L.01	L.01	L.01	L.01	L.01	L.01	L.01	L.01
	.8	L.01	.04	L.01	L.01	L.01	L.01	L.01	L.01	L.01
PARAMETER: 26004P - IRON TOTAL - MG/L										
	.2	.29	.41	.25	.70	.27	.40	.16	.13	.12
	.8	.30	1.30	.55	.38	.25	.35	.17	.11	.14
PARAMETER: 26105P - IRON DISSOLVED - MG/L										
	.2	.006	.006	.005	.010	.018	.006	.008	.003	.005
	.8	.005	.006	.025	.004	.005	.005	.004	.005	.024
PARAMETER: 26304P - IRON EXTRBLE. - MG/L										
	.2	.21	.30	.10	.10	.12	.10	.09	.07	.09
	.8	.19	2.40	.35	.68	.15	.12	.12	.10	.10
PARAMETER: 28002P - NICKEL TOTAL - MG/L										
	.2	.005	L.001	L.001	L.001	L.001	L.001	L.001	L.001	L.001
	.8	L.001	L.001	L.001	L.001	L.001	L.001	L.001	L.001	L.001
PARAMETER: 28102P - NICKEL DISSOLVED - MG/L										
	.2	L.001	L.001	L.001	L.001	L.001	L.001	L.001	L.001	.001
	.8	L.001	.001	L.001	L.001	L.001	L.001	L.001	L.001	L.001
PARAMETER: 28302P - NICKEL EXTRBLE. - MG/L										
	.2	L.001	L.001	L.001	L.001	L.001	.002	.001	L.001	.001
	.8	L.001	.002	L.001	L.001	L.001	L.001	L.001	L.001	L.001
PARAMETER: 29005P - COPPER TOTAL - MG/L										
	.2	.007	.008	.005	.007	.006	.006	.006	.004	.006
	.8	.007	.018	.013	.009	.007	.007	.007	.007	.005
PARAMETER: 29105P - COPPER DISSOLVED - MG/L										
	.2	.002	L.001	.001	.002	.001	.001	.001	L.001	L.001
	.8	.002	.003	.001	.002	.002	.002	.001	L.001	.001
PARAMETER: 29305P - COPPER EXTRBLE. - MG/L										
	.2	.002	.003	.002	.002	.002	.002	.004	.002	.001
	.8	.002	.02	.003	.005	.005	.002	.002	.002	.002

POINTS ON THE CROSS SECTION

	% DEPTH	R1	R2	R3	R4	R5	R6	R7	R8	R9
SAMPLING	.8	1430	1450	1510	1530	1550	1610	1630	1650	1750
TIMES:	.2	1440	1500	1520	1540	1600	1620	1640	1700	1800
PARAMETER: 30004P - ZINC TOTAL - MG/L										
	.2	.03	.02	.018	.02	.02	.018	.015	.011	.012
	.8	.03	.09	.04	.03	.018	.017	.015	.01	.010
PARAMETER: 30105P - ZINC DISSOLVED - MG/L										
	.2	.007	.007	.007	.007	.006	.006	.006	.006	.006
	.8	.008	.006	.008	.007	.007	.006	.006	.006	.005
PARAMETER: 30304P - ZINC EXTRBLE. - MG/L										
	.2	.02	.03	.015	.014	.014	.011	.012	.012	.010
	.8	.02	.20	.03	.03	.015	.014	.014	.011	.012
PARAMETER: 33010L - ARSENIC TOTAL - MG/L										
	.2	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0004	.0003
	.8	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003
PARAMETER: 33104L - ARSENIC DISSOLVED - MG/L										
	.2	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0003	.0003
	.8	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0003	.0003
PARAMETER: 34010L - SELENIUM TOTAL - MG/L										
	.2	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0001	.0001
	.8	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002
PARAMETER: 34102L - SELENIUM DISSOLVED - MG/L										
	.2	.0001	.0001	.0001	.0001	.0001	L.0001	.0002	.0001	L.0001
	.8	.0001	.0001	.0001	.0001	L.0001	.0001	.0001	.0001	.0001
PARAMETER: 47002P - SILVER TOTAL - MG/L										
	.2	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005
	.8	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005
PARAMETER: 47102P - SILVER DISSOLVED - MG/L										
	.2	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005
	.8	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005
PARAMETER: 47302P - SILVER EXTRBLE. - MG/L										
	.2	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005
	.8	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005	L.005

POINTS ON THE CROSS SECTION

SAMPLING TIMES:	% DEPTH	R1	R2	R3	R4	R5	R6	R7	R8	R9
	.8	1430	1450	1510	1530	1550	1610	1630	1650	1750
	.2	1440	1500	1520	1540	1600	1620	1640	1700	1800
PARAMETER: 51004L - ANTIMONY TOTAL - MG/L										
	.2	.003	.003	.001	.002	.002	.002	L.001	L.001	L.001
	.8	.003	.004	.001	.002	.002	L.001	.002	L.001	.001
PARAMETER: 51104L - ANTIMONY DISSOLVED - MG/L										
	.2	.001	.003	L.001	L.001	L.001	.001	L.001	L.001	L.001
	.8	L.001	.001	L.001	L.001	L.001	L.001	L.001	L.001	.001
PARAMETER: 56001L - BARIUM TOTAL - MG/L										
	.2	L.1	L.1	L.1	L.1	L.1	L.1	L.1	L.1	L.1
	.8	L.1	L.1	L.1	L.1	L.1	L.1	L.1	L.1	L.1
PARAMETER: 56101L - BARIUM DISSOLVED - MG/L										
	.2	L.1	L.1	L.1	L.1	L.1	L.1	L.1	L.1	L.1
	.8	L.1	L.1	L.1	L.1	L.1	L.1	L.1	L.1	.1
PARAMETER: 80011P - MERCURY TOTAL - UG/L										
	.2	L.05	L.05	L.05	L.05	L.05	L.05	L.05	L.05	L.05
	.8	L.05	L.05	L.05	L.05	L.05	L.05	L.05	L.05	L.05
PARAMETER: 80111P - MERCURY DISSOLVED - UG/L										
	.2	L.05	L.05	L.05	L.05	L.05	L.05	L.05	L.05	L.05
	.8	L.05	L.05	L.05	L.05	L.05	L.05	L.05	L.05	L.05
PARAMETER: 82002P - LEAD TOTAL - MG/L										
	.2	.004	.005	.005	.006	.004	.003	.002	.003	.003
	.8	.005	.004	.005	.005	.003	.003	.003	.002	.003
PARAMETER: 82103P - LEAD DISSOLVED - MG/L										
	.2	.002	.001	.002	.002	.002	L.001	L.001	L.001	.001
	.8	.001	.001	.002	.001	.002	L.001	.002	L.001	L.001
PARAMETER: 82302P - LEAD EXTRBLE. - MG/L										
	.2	.006	.006	.005	.005	.004	.004	.004	.005	.004
	.8	.005	.006	.005	.005	.005	.004	.004	.004	.004

Table 11

Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on July 26, 1978.

Distance from Left Bank (m)	Velocity (Mean in Vertical)	Discharge
20	.84	110.62
50	1.91	468.68
80	2.75	604.83
110	2.47	505.86
140	2.15	385.87
170	1.20	46.24
	Total	2122.13

Table 12

Velocity (m/s) measured at each point on the cross section and each depth on July 26, 1978.

Distance from Left Bank (m)	Velocity Measured at 20% of Total Depth	50%	80%
20	1.12	.98	.55
50	2.15	2.08	1.68
80	3.05	2.74	2.46
110	2.69	2.64	2.08
140	2.29	2.15	2.02
170	1.23	1.21	1.18

Table 13

NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on July 26, 1978. Concentrations of most substances are expressed in mg/L.

POINTS ON THE CROSS SECTION

DATE: 780726

SAMPLING TIME DEPTH	R1 1350-1415	R2 1330-1345	R3 1317-1325	R4 1303-1313	R5 1252-1258	R6 1240-1250
PARAMETER: 02011L - COLOUR APPARENT - REL. UNITS						
.8	5.	--	--	L5.	--	L5.
PARAMETER: 02041L - SPECIFIC CONDUCT. - USIE/CM						
.8	127.	--	--	128.	--	127.
PARAMETER: 02061L - TEMP. WATER - DEG.C.						
.8	19.8	--	--	19.8	--	20.0
PARAMETER: 02073L - TURBIDITY - JTU						
.8	.9	--	--	1.0	--	.9
PARAMETER: 06606P - CYANIDE - MG/L						
.2	.001	--	--	.001	--	.001
.5	.001	--	--	.001	--	.001
.8	.001	--	--	.001	--	.001
PARAMETER: 07110L - NITROGEN DISSOLVED NO3 & NO2 - MG/L						
.2	.048	.048	.048	.048	.050	.049
.5	.048	.048	.047	.048	.048	.049
.8	.050	.049	.048	.048	.049	.049
PARAMETER: 07557L - NITROGEN DISSOLVED AMMONIA - MG/L						
.2	.030	.031	.032	.026	.010	.030
.5	.026	.032	.032	.019	.032	.026
.8	.034	.032	.032	.032	.031	.029
PARAMETER: 07651L - NITROGEN DISSOLVED - MG/L						
.2	.14	.15	.15	.16	.17	.16
.5	.16	.15	.15	.16	.15	.17
.8	.15	.15	.16	.17	.16	.18
PARAMETER: 09106L - FLUORIDE DISSOLVED - MG/L						
.8	.1	--	--	.1	--	.2

POINTS ON THE CROSS SECTION

DATE: 780726

SAMPLING TIME / DEPTH	R1 1350-1415	R2 1330-1345	R3 1317-1325	R4 1303-1313	R5 1252-1258	R6 1240-1250
PARAMETER: 10101L - ALKALINITY TOTAL - MG/L						
.8	47.1	--	--	47.5	--	46.9
PARAMETER: 10151L - ALKALINITY PHENOL PHTHALEIN - MG/L						
.8	.0	--	--	.0	--	.0
PARAMETER: 10301L - PH - PH UNITS						
.8	7.8	--	--	7.7	--	7.8
PARAMETER: 10401L - RESIDUE NONFILTR. - MG/L						
.8	1.	--	--	2.	--	2.
PARAMETER: 10451L - RESIDUE FILTERABLE - MG/L						
.8	83.	--	--	77.	--	80.
PARAMETER: 10501L - RESIDUE FIXED NONFILTR. - MG/L						
.8	L1.	--	--	L1.	--	L1.
PARAMETER: 10551L - RESIDUE FIXED FILTERABLE - MG/L						
.8	54.	--	--	50.	--	48.
PARAMETER: 10603L - HARDNESS TOTAL - MG/L						
.8	59.7	--	--	59.9	--	59.7
PARAMETER: 11103L - SODIUM DISSOLVED - MG/L						
.8	1.4	--	--	1.2	--	1.2
PARAMETER: 12101L - MAGNESIUM DISSOLVED (CALCD.) - MG/L						
.8	3.0	--	--	3.3	--	3.4
PARAMETER: 14105L - SILICA REACTIVE - MG/L						
.8	4.1	--	--	4.2	--	4.1

POINTS ON THE CROSS SECTION

DATE: 780726

SAMPLING TIME DEPTH	R1 1350-1415	R2 1330-1345	R3 1317-1325	R4 1303-1313	R5 1252-1258	R6 1240-1250
PARAMETER: 15102L - PHOSPHORUS TOTAL DISSOLVED - MG/L						
.2	.029	.030	.029	.030	.028	.026
.5	.029	.033	.031	.030	.028	.022
.8	.028	.029	.030	.034	.028	.026
PARAMETER: 15406L - PHOSPHORUS TOTAL - MG/L						
.2	.041	.042	.045	.042	.044	.034
.5	.040	.058	.042	.042	.040	.038
.8	.040	.042	.040	.042	.041	.038
PARAMETER: 16306L - SULPHATE DISSOLVED - MG/L						
.8	14.	--	--	15.	--	15.
PARAMETER: 17206L - CHLORIDE DISSOLVED - MG/L						
.8	.7	--	--	.7	--	.7
PARAMETER: 19103L - POTASSIUM DISSOLVED - MG/L						
.8	.6	--	--	.6	--	.6
PARAMETER: 20101L - CALCIUM DISSOLVED - MG/L						
.8	19.0	--	--	18.6	--	18.3
PARAMETER: 25004P - MANGANESE TOTAL - MG/L						
.2	.01	.01	L.01	L.01	L.01	L.01
.5	L.01	.03	.01	L.01	L.01	L.01
.8	.01	.01	.01	.01	L.01	.01
PARAMETER: 26004P - IRON TOTAL - MG/L						
.2	.22	.46	.28	.16	.10	.08
.5	.16	1.50	.53	.15	.16	.09
.8	.23	.09	.46	.35	.14	.08
PARAMETER: 28002P - NICKEL TOTAL - MG/L						
.2	.003	.003	.001	.002	.002	.001
.5	.001	.006	.002	.002	.003	.001
.8	.002	.004	.001	.003	.001	.002

POINTS ON THE CROSS SECTION

DATE: 780726

SAMPLING TIME DEPTH	R1 1350-1415	R2 1330-1345	R3 1317-1325	R4 1303-1313	R5 1252-1258	R6 1240-1250
PARAMETER: 29005P - COPPER TOTAL - MG/L						
.2	.004	.006	.005	.004	.003	.003
.5	.003	.012	.008	.005	.005	.003
.8	.003	.010	.008	.006	.007	.004
PARAMETER: 30004P - ZINC TOTAL - MG/L						
.2	.03	.06	.035	.025	.025	.03
.5	.025	.11	.035	.025	.04	.03
.8	.03	.06	.05	.05	.05	.03
PARAMETER: 82002P - LEAD TOTAL - MG/L						
.2	.008	.008	.009	.010	.010	.008
.5	.011	.007	.009	.009	.010	.010
.8	.007	.009	.009	.008	.010	.010

Table 14

Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on November 16, 1978.

Distance from Left Bank (m)	Velocity (Mean in Vertical)	Discharge
20	.60	83.51
50	1.72	384.14
80	2.28	470.74
110	2.16	414.62
140	1.91	310.31
170	.85	21.96
	Total	1685.29

Table 15

Velocity (m/s) measured at each point on the cross section and each depth on November 16, 1978.

Distance from Left Bank (m)	Velocity Measured at 20% of Total Depth	50%	80%
20	.69	.62	.50
50	1.95	1.74	1.48
80	2.61	2.65	1.95
110	2.54	2.23	1.78
140	2.16	1.99	1.66
170	.83	.87	.86

Table 16

NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on November 16, 1978. Concentrations of most substances are expressed in mg/L.

POINTS ON THE CROSS SECTION

DATE: 781116

SAMPLING TIME / DEPTH	R1 1358-1412	R2 1342-1353	R3 1328-1338	R4 1307-1315	R5 1252-1300	R6 1235-1246
PARAMETER: 02011L - COLOUR APPARENT - REL. UNITS						
.5	5.	L5.	5.	5.	5.	5.
PARAMETER: 02041L - SPECIFIC CONDUCT. - USIE/CM						
.5	146.	145.	145.	145.	145.	145.
PARAMETER: 02061L - TEMP. WATER - DEG.C.						
.5	21.0	21.0	20.9	20.9	20.9	20.9
PARAMETER: 02073L - TURBIDITY - JTU						
.5	.6	1.0	1.0	1.0	.7	.7
PARAMETER: 07110L - NITROGEN DISSOLVED NO3 & NO2 - MG/L						
.2	.077	.078	.077	.077	.078	.081
.5	.078	.078	.077	.076	.079	.080
.8	.078	.077	.077	.077	.079	.081
PARAMETER: 07557L - NITROGEN DISSOLVED AMMONIA - MG/L						
.2	.110	.120	.110	.120	.130	.150
.5	.120	.120	.110	.120	.120	.150
.8	.120	.120	.110	.120	.130	.150
PARAMETER: 07651L - NITROGEN DISSOLVED - MG/L						
.2	.18	.18	.19	.20	.22	.24
.5	.19	.18	.19	.20	.22	.25
.8	.18	.19	.19	.20	.23	.26
PARAMETER: 09106L - FLUORIDE DISSOLVED - MG/L						
.5	.1	.1	.2	.2	.2	.2
PARAMETER: 10101L - ALKALINITY TOTAL - MG/L						
.5	55.0	54.7	54.7	54.7	54.1	54.1
PARAMETER: 10151L - ALKALINITY PHENOL PHTHALEIN - MG/L						
.5	.0	.0	.0	.0	.0	.0

POINTS ON THE CROSS SECTION

DATE: 781116

SAMPLING TIME / DEPTH	R1 1356-1412	R2 1342-1353	R3 1325-1338	R4 1307-1315	R5 1252-1300	R6 1235-1246
PARAMETER: 10301L - PH - PH UNITS						
.5	7.6	7.8	7.7	7.7	7.7	7.7
PARAMETER: 10401L - RESIDUE NONFILTR. - MG/L						
.5	L1.	1.	L1.	2.	2.	1.
PARAMETER: 10451L - RESIDUE FILTERABLE - MG/L						
.5	85.	78.	80.	77.	87.	81.
PARAMETER: 10501L - RESIDUE FIXED NONFILTR. - MG/L						
.5	L1.	L1.	L1.	1.	2.	L1.
PARAMETER: 10551L - RESIDUE FIXED FILTERABLE - MG/L						
.5	76.	72.	74.	71.	73.	67.
PARAMETER: 10603L - HARDNESS TOTAL - MG/L						
.5	71.8	72.2	71.8	73.6	71.2	72.8
PARAMETER: 11103L - SODIUM DISSOLVED - MG/L						
.5	1.4	1.4	1.4	1.5	1.5	1.5
PARAMETER: 12101L - MAGNESIUM DISSOLVED (CALCD.) - MG/L						
.5	4.3	5.1	4.6	5.6	4.4	4.5
PARAMETER: 14105L - SILICA REACTIVE - MG/L						
.5	3.9	3.9	3.9	3.9	3.9	3.9
PARAMETER: 15102L - PHOSPHORUS TOTAL DISSOLVED - MG/L						
.2	.035	.035	.035	.033	.033	.033
.5	.035	.035	.033	.033	.034	.033
.8	.034	.035	.033	.033	.034	.034
PARAMETER: 15406L - PHOSPHORUS TOTAL - MG/L						
.2	.037	.037	.037	.035	.036	.037
.5	.037	.038	.035	.036	.036	.039
.8	.038	.040	.037	.033	.036	.036

POINTS ON THE CROSS SECTION

DATE: 781116

SAMPLING TIME DEPTH	R1 1358-1412	R2 1342-1353	R3 1325-1338	R4 1307-1315	R5 1252-1300	R6 1235-1246
PARAMETER: 16306L - SULPHATE DISSOLVED - MG/L						
.5	16.	16.	16.	16.	16.	16.
PARAMETER: 17206L - CHLORIDE DISSOLVED - MG/L						
.5	1.0	1.0	1.0	1.0	1.0	1.0
PARAMETER: 19103L - POTASSIUM DISSOLVED - MG/L						
.5	.5	.5	.5	.5	.5	.5
PARAMETER: 20101L - CALCIUM DISSOLVED - MG/L						
.5	21.7	20.5	21.1	20.2	21.2	21.8
PARAMETER: 25004P - MANGANESE TOTAL - MG/L						
.2	L.01	.01	.01	.02	.01	.01
.5	.01	.01	.01	.02	L.01	.01
.8	L.01	.01	.01	.01	.01	L.01
PARAMETER: 26004P - IRON TOTAL - MG/L						
.2	.07	.15	.09	2.50	.64	.64
.5	.07	.12	.09	2.60	.25	.32
.8	.07	.24	.15	.96	1.40	.38
PARAMETER: 28002P - NICKEL TOTAL - MG/L						
.2	.001	L.001	.001	.006	L.001	.002
.5	L.001	L.001	.001	.001	.001	.002
.8	L.001	.001	L.001	.001	L.001	.001
PARAMETER: 29005P - COPPER TOTAL - MG/L						
.2	.005	.007	.005	.008	.004	.005
.5	.006	.008	.005	.004	.005	.005
.8	.009	.006	.006	.005	.005	.005
PARAMETER: 30005P - ZINC TOTAL - MG/L						
.2	.064	.070	.064	.068	.056	.062
.5	.065	.070	.069	.068	.058	.066
.8	.066	.071	.071	.062	.056	.065

POINTS ON THE CROSS SECTION

DATE: 781116

SAMPLING TIME DEPTH	R1 1358-1412	R2 1342-1353	R3 1325-1338	R4 1307-1315	R5 1252-1300	R6 1235-1246
PARAMETER: 48002P - CADMIUM TOTAL - MG/L						
.2	.0005	.0005	.0010	.0005	.0005	.0010
.5	.0005	.0005	.0005	.0010	.0005	.0010
.8	.0005	.0005	L.0005	.0005	.0005	.0020
PARAMETER: 80311P - MERCURY EXTRBLE. - UG/L						
.2	.05	--	L.05	--	L.05	--
.5	.05	--	.05	--	.05	--
.8	.05	--	.05	--	.05	--
PARAMETER: 82002P - LEAD TOTAL - MG/L						
.2	.005	.006	.007	.005	.006	.004
.5	.006	.007	.005	.005	.003	.003
.8	.005	.005	.005	.005	.003	.005

Table 17

Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on May 3, 1979.

Distance from Left Bank (m)	Velocity (Mean in Vertical)	Discharge
20	1.01	103.01
50	1.84	426.48
80	2.59	549.02
110	2.32	469.78
140	2.06	358.84
170	1.18	48.39
	Total	1955.53

Table 18

Velocity (m/s) measured at each point on the cross section and each depth on May 3, 1979.

Distance from Left Bank (m)	Velocity Measured at 20% of Total Depth	50%	80%
20	1.21	1.00	.80
50	2.03	1.99	1.64
80	2.82	2.65	2.36
110	2.68	2.26	1.95
140	2.42	2.12	1.69
170	1.23	1.21	1.12

Table 19

NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on May 3, 1979. Concentrations of most substances are expressed in mg/L.

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME / DEPTH	R1 1020-1045	R2	R3 1112-1132	R4	R5 1136-1203	R6
PARAMETER: 02011 - COLOUR APPARENT - REL. UNITS						
.2	5.	--	5.	--	5.	--
.5	L5.	--	5.	--	5.	--
.8	L5.	--	5.	--	L5.	--
BANK	L5.	5.	5.	--	5.	5.
TIME	1020	1055	1125		1200	1230
PARAMETER: 02041 - SPECIFIC CONDUCT. - USIE/CM						
.2	145.	--	145.	--	145.	--
.5	145.	--	140.	--	143.	--
.8	145.	--	144.	--	143.	--
BANK	146.	145.	145.	--	145.	145.
TIME	1020	1055	1125		1200	1230
PARAMETER: 02061 - TEMP. WATER - DEG.C.						
.2	20.0	--	20.3	--	20.2	--
.5	20.1	--	20.2	--	20.1	--
.8	20.1	--	20.1	--	20.0	--
BANK	20.0	20.1	20.1	--	20.0	20.1
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2	R3 1112-1132	R4	R5 1136-1203	R6
PARAMETER: 02073 - TURBIDITY - JTU						
.2	.86	--	.90	--	.90	--
.5	.90	--	.85	--	.74	--
.8	1.00	--	.85	--	.87	--
BANK	1.00	1.00	.94	--	.63	.65
TIME	1020	1055	1125		1200	1230
PARAMETER: 10101 - ALKALINITY TOTAL - MG/L						
.2	55.1	--	55.3	--	54.1	--
.5	54.7	--	55.7	--	55.5	--
.8	55.1	--	55.9	--	55.7	--
BANK	54.9	55.3	55.7	--	55.5	56.3
TIME	1020	1055	1125		1200	1230
PARAMETER: 10151 - ALKALINITY PHENOL PHTHALEIN - MG/L						
.2	.0	--	.0	--	.0	--
.5	.0	--	.0	--	.0	--
.8	.0	--	.0	--	.0	--
BANK	.0	.0	.0	--	.0	.0
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2	R3 1112-1132	R4	R5 1136-1203	R6
PARAMETER: 10301 - PH - PH UNITS						
.2	7.80	--	7.60	--	7.80	--
.5	7.90	--	7.80	--	7.80	--
.8	7.70	--	7.70	--	7.70	--
BANK	7.70	7.60	7.90	--	7.90	7.80
TIME	1020	1055	1125		1200	1230
PARAMETER: 10401 - RESIDUE NONFILTR. - MG/L						
.2	2.	--	4.	--	2.	--
.5	3.	--	4.	--	4.	--
.8	4.	--	4.	--	3.	--
BANK	3.	3.	2.	--	2.	2.
TIME	1020	1055	1125		1200	1230
PARAMETER: 10451 - RESIDUE FILTERABLE - MG/L						
.2	77.	--	89.	--	86.	--
.5	74.	--	90.	--	93.	--
.8	83.	--	90.	--	93.	--
BANK	93.	86.	91.	--	85.	93.
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2	R3 1112-1132	R4	R5 1136-1203	R6
PARAMETER: 10501 - RESIDUE FIXED NONFILTR. - MG/L						
.2	L1.	--	2.	--	L1.	--
.5	1.	--	2.	--	2.	--
.8	2.	--	2.	--	2.	--
BANK	L1.	2.	2.	--	L1.	L1.
TIME	1020	1055	1125		1200	1230
PARAMETER: 10551 - RESIDUE FIXED FILTERABLE - MG/L						
.2	64.	--	69.	--	72.	--
.5	60.	--	76.	--	80.	--
.8	57.	--	69.	--	74.	--
BANK	78.	71.	82.	--	71.	80.
TIME	1020	1055	1125		1200	1230
PARAMETER: 10603 - HARDNESS TOTAL - MG/L						
.2	69.0	--	68.0	--	70.2	--
.5	71.2	--	72.0	--	72.0	--
.8	69.0	--	70.0	--	72.0	--
BANK	70.6	69.0	70.6	--	68.2	68.4
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2	R3 1112-1132	R4	R5 1136-1203	R6
PARAMETER: 17206 - CHLORIDE DISSOLVED - MG/L						
.2	.7	--	.7	--	.7	--
.5	.7	--	.7	--	.7	--
.8	.7	--	.7	--	.7	--
BANK	.7	.7	.7	--	.7	.7
TIME	1020	1055	1125		1200	1230
PARAMETER: 19103 - POTASSIUM DISSOLVED - MG/L						
.2	.6	--	.5	--	.6	--
.5	.5	--	.5	--	.5	--
.8	.5	--	.5	--	.6	--
BANK	.6	.6	.6	--	.8	.7
TIME	1020	1055	1125		1200	1230
PARAMETER: 33304 - ARSENIC EXTRBLE. - MG/L						
.2	.0004	--	.0004	--	.0003	--
.5	.0004	--	.0002	--	.0002	--
.8	.0004	--	.0003	--	.0002	--
BANK	.0002	.0002	.0002	--	.0002	.0002
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME / DEPTH	R1 1020-1045	R2	R3 1112-1132	R4	R5 1136-1203	R6
PARAMETER: 11103 - SODIUM DISSOLVED - MG/L						
.2	1.6	--	1.4	--	1.5	--
.5	1.4	--	1.4	--	1.4	--
.8	1.4	--	1.3	--	1.5	--
BANK	1.5	1.6	1.6	--	2.0	1.9
TIME	1020	1055	1125		1200	1230
PARAMETER: 12101 - MAGNESIUM DISSOLVED (CALCD.) - MG/L						
.2	5.1	--	3.7	--	5.7	--
.5	5.6	--	6.1	--	6.3	--
.8	4.9	--	5.7	--	6.1	--
BANK	4.8	5.1	4.6	--	4.3	3.9
TIME	1020	1055	1125		1200	1230
PARAMETER: 14105 - SILICA REACTIVE - MG/L						
.2	4.2	--	4.1	--	4.1	--
.5	4.2	--	4.1	--	4.1	--
.8	4.2	--	4.2	--	4.1	--
BANK	4.2	4.2	4.2	--	4.2	4.2
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2	R3 1112-1132	R4	R5 1136-1203	R6
PARAMETER: 34302 - SELENIUM EXTRBLE. - MG/L						
.2	.0001	--	.0001	--	.0001	--
.5	.0001	--	.0001	--	.0002	--
.8	.0001	--	.0001	--	.0003	--
BANK	.0002	L.0001	L.0001	--	L.0001	L.0001
TIME	1020	1055	1125		1200	1230
PARAMETER: 80311 - MERCURY EXTRBLE. - UG/L						
.2	L.05	L.05	L.05	L.05	L.05	L.05
.5	L.05	L.05	L.05	L.05	L.05	L.05
.8	L.05	L.05	L.05	L.05	L.05	L.05
BANK	L.05	L.05	L.05	--	L.05	L.05
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2 1049-1105	R3 1112-1132	R4 1140-1155	R5 1136-1203	R6 1230-1247
PARAMETER: 07110 - NITROGEN DISSOLVED NO3 & NO2 - MG/L						
.2	.110	.110	.110	.110	.110	.110
	.110	.110	.110	.110	.110	.110
	.110	.110	.110	.110	.110	.110
.5	.110	.110	.110	.110	.120	.110
	.110	.110	.110	.110	.110	.110
	.110	.110	.110	.110	.110	.110
.8	.110	.110	.120	.110	.110	.110
	.110	.110	.110	.110	.120	.110
	.110	.110	.110	.110	.110	.110
BANK	.110	.120	.110	--	.110	.110
	.120	.120	.120	--	.110	.110
	.120	.120	.110	--	.110	.110
TIME	1020	1055	1125		1200	1230
PARAMETER: 07557 - NITROGEN DISSOLVED AMMONIA - MG/L						
.2	.070	.065	.061	.054	.052	.110
	.069	.064	.058	.057	.053	.110
	.067	.065	.060	.057	.053	.110
.5	.069	.065	.062	.058	.050	.086
	.071	.065	.062	.057	.049	.084
	.069	.063	.060	.058	.051	.081
.8	.070	.064	.062	.058	.050	.064
	.072	.064	.063	.058	.050	.062
	.072	.064	.064	.058	.051	.065
BANK	.074	.076	.060	--	.057	.055
	.073	.076	.060	--	.057	.055
	.073	.076	.060	--	.055	.052
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME / DEPTH	R1 1020-1045	R2 1049-1105	R3 1112-1132	R4 1140-1155	R5 1136-1203	R6 1230-1247
PARAMETER: 07651 - NITROGEN DISSOLVED - MG/L						
.2	.220	.210	.220	.210	.190	.250
	.220	.220	.210	.210	.190	.250
	.220	.220	.220	.210	.190	.250
.5	.220	.220	.220	.210	.190	.230
	.220	.220	.210	.210	.190	.230
	.220	.220	.210	.210	.190	.220
.8	.220	.220	.220	.200	.190	.210
	.240	.220	.220	.200	.190	.210
	.220	.220	.220	.200	.190	.210
BANK	.230	.210	.210	--	.210	.200
	.220	.210	.210	--	.210	.200
	.230	.210	.210	--	.210	.210
TIME	1020	1055	1125		1200	1230
PARAMETER: 09106 - FLUORIDE DISSOLVED - MG/L						
.2	.138	.123	.119	.128	.121	.127
	.148	.130	.121	.116	.124	.133
	.153	.135	.125	.123	.117	.129
.5	.143	.128	.123	.117	.117	.132
	.145	.132	.130	.119	.120	.130
	.147	.138	.128	.121	.118	.128
.8	.152	.141	.122	.130	.122	.126
	.158	.140	.128	.126	.121	.121
	.145	.138	.127	.122	.118	.126
BANK	.141	.128	.129	--	.117	.129
	.147	.131	.132	--	.122	.133
	.150	.133	.112	--	.120	.134
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2 1049-1105	R3 1112-1132	R4 1140-1155	R5 1136-1203	R6 1230-1247
PARAMETER: 15102 - PHOSPHORUS TOTAL DISSOLVED - MG/L						
.2	.051	--	.036	--	.039	--
	.051	--	.039	--	.040	--
	.051	--	.037	--	.039	--
.5	.055	--	.037	--	.039	--
	.053	--	.038	--	.039	--
	.056	--	.038	--	.039	--
.8	.056	--	.039	--	.037	--
	.058	--	.040	--	.038	--
	.057	--	.039	--	.038	--
BANK	.058	.047	.041	--	.038	.039
	.058	.047	.041	--	.041	.040
	.058	.047	.042	--	.037	.040
TIME	1020	1055	1125		1200	1230
PARAMETER: 15406 - PHOSPHORUS TOTAL - MG/L						
.2	.060	.052	.046	.045	.047	.053
	.061	.052	.046	.046	.047	.049
	.061	.051	.046	.045	.047	.058
.5	.065	.058	.048	.044	.057	.052
	.064	.054	.046	.045	.046	.049
	.064	.052	.047	.043	.052	.049
.8	.067	.056	.050	.043	.046	.051
	.072	.055	.050	.042	.048	.048
	.069	.058	.051	.049	.046	--
BANK	.069	.058	.050	--	.048	.049
	.069	.057	.049	--	.047	.048
	.070	.056	.048	--	.045	.049
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2 1049-1105	R3 1112-1132	R4 1140-1155	R5 1136-1203	R6 1230-1247
PARAMETER: 16306 - SULPHATE DISSOLVED - MG/L						
.2	15.2	15.2	15.4	15.1	14.8	15.2
	15.2	15.2	15.4	14.9	14.8	15.2
	15.3	15.2	15.1	14.9	14.8	15.1
.5	15.4	15.3	15.1	15.0	14.9	15.0
	15.4	15.3	15.1	14.9	14.9	15.0
	15.5	15.2	15.2	14.9	14.8	15.1
.8	15.5	15.5	15.3	15.0	15.1	15.1
	15.5	15.6	15.1	15.0	14.8	15.0
	15.4	15.7	15.1	14.8	14.9	15.1
BANK	15.6	15.4	15.4	--	15.2	15.0
	15.7	15.4	15.4	--	15.2	15.0
	15.7	15.6	15.4	--	15.1	15.1
TIME	1020	1055	1125		1200	1230
PARAMETER: 20101 - CALCIUM DISSOLVED - MG/L						
.2	20.7	20.7	20.7	20.3	20.7	20.3
	20.3	20.7	20.7	20.5	20.7	20.3
	20.3	20.6	20.6	20.5	20.3	21.3
.5	20.7	20.1	20.7	20.6	20.7	20.6
	20.7	20.3	20.3	20.8	20.7	20.7
	20.6	20.6	20.6	20.7	20.5	20.5
.8	20.3	20.6	20.7	20.5	20.7	20.3
	20.3	20.3	20.8	20.6	20.6	20.7
	20.3	20.3	21.1	20.7	20.7	20.3
BANK	20.3	21.1	20.7	--	20.5	20.5
	20.6	20.3	20.3	--	20.7	20.9
	20.7	20.6	20.7	--	20.3	20.3
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2 1049-1105	R3 1112-1132	R4 1140-1155	R5 1136-1203	R6 1230-1247
PARAMETER: 25004 - MANGANESE TOTAL - MG/L						
.2	.01	.02	.03	.02	.01	.02
	.03	.03	.02	.02	.01	.02
	.03	.03	.02	.01	.02	.02
.5	.03	.02	.02	.01	.02	.02
	.02	.04	.02	.01	.02	.02
	.03	.03	.02	.02	.02	.02
.8	L.01	.03	.02	.02	.02	.02
	.02	.04	.02	.01	.02	.02
	.02	.04	.02	.01	.01	.02
BANK	.02	.02	.02	--	.02	.02
	.03	.02	.02	--	.02	.02
	.02	.02	.02	--	.02	.01
TIME	1020	1055	1125		1200	1230
PARAMETER: 26004 - IRON TOTAL - MG/L						
.2	.11	.35	.20	.10	.12	.10
	.23	.32	.17	.10	.10	.08
	.12	.25	.12	.12	.11	.15
.5	.12	.25	.16	.14	.09	.08
	.14	.43	.17	.12	.13	.08
	.17	.36	.23	.20	.11	.07
.8	.12	.39	.23	.21	.14	.09
	.15	.53	.23	.15	.15	.07
	.21	1.00	.18	.22	.13	.11
BANK	.10	.07	.07	--	.08	.09
	.07	.07	.09	--	.07	.08
	.07	.06	.07	--	.06	.06
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2 1049-1105	R3 1112-1132	R4 1140-1155	R5 1136-1203	R6 1230-1247
PARAMETER: 28002 - NICKEL TOTAL - MG/L						
.2	L.001	L.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	L.001	L.001
.5	L.001	L.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	L.001	L.001
.8	L.001	L.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	L.001	L.001
BANK	L.001	L.001	L.001	--	L.001	L.001
	L.001	L.001	L.001	--	L.001	L.001
	L.001	L.001	L.001	--	L.001	L.001
TIME	1020	1055	1125		1200	1230
PARAMETER: 29005 - COPPER TOTAL - MG/L						
.2	.001	.007	.003	.004	.004	.003
	.004	.003	.004	.004	.004	.004
	.001	.004	.003	.004	.003	.004
.5	.002	.006	.002	.005	.003	.003
	.005	.007	.004	.005	.004	.004
	.003	.006	.005	.006	.004	.004
.8	.003	.007	.004	.004	.005	.004
	.003	.008	.004	.004	.005	.004
	.004	.014	.002	.004	.005	.004
BANK	.004	.004	.002	--	.004	.003
	.002	.002	.002	--	.005	.003
	.003	.002	.003	--	.003	.004
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2 1049-1105	R3 1112-1132	R4 1140-1155	R5 1136-1203	R6 1230-1247
PARAMETER: 30004 - ZINC TOTAL - MG/L						
.2	.05	.06	.05	.03	.04	.03
	.06	.06	.03	.03	.04	.03
	.05	.07	.04	.03	.03	.04
.5	.05	.06	.05	.05	.03	.03
	.05	.07	.06	.05	.04	.03
	.06	.06	.05	.05	.03	.03
.8	.06	.07	.06	.05	.04	.03
	.05	.08	.05	.05	.04	.03
	.05	.10	.06	.05	.04	.03
BANK	.05	.05	.05	--	.04	.03
	.05	.06	.05	--	.04	.03
	.05	.05	.05	--	.04	.03
TIME	1020	1055	1125		1200	1230
PARAMETER: 48002 - CADMIUM TOTAL - MG/L						
.2	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
.5	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
.8	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
BANK	L.0005	L.0005	L.0005	--	L.0005	L.0005
	L.0005	L.0005	L.0005	--	L.0005	L.0005
	L.0005	L.0005	L.0005	--	L.0005	L.0005
TIME	1020	1055	1125		1200	1230

POINTS ON THE CROSS SECTION

DATE: 790503

SAMPLING TIME DEPTH	R1 1020-1045	R2 1049-1105	R3 1112-1132	R4 1140-1155	R5 1136-1203	R6 1230-1247
PARAMETER: 82002 - LEAD TOTAL - MG/L						
.2	.002	.002	.003	.003	.003	.005
	.003	.003	.003	.003	.003	.004
	.002	.004	.003	.003	.003	.007
.5	.003	.003	.004	.003	.003	.004
	.003	.003	.004	.003	.003	.004
	.003	.003	.004	.003	.003	.004
.8	.004	.003	.005	.004	.006	.005
	.004	.003	.003	.004	.004	.005
	.003	.003	.003	.003	.004	.004
BANK	.005	.003	.003	--	.003	.003
	.004	003	.002	--	.004	.003
	.003	003	.002	--	.003	.003
TIME	1020	1055	1125		1200	1230

Table 20

Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on June 6, 1979.

Distance from Left Bank (m)	Velocity (Mean in Vertical)	Discharge
20	1.01	151.46
50	1.76	466.75
80	2.15	529.29
110	1.96	455.88
140	1.83	373.64
170	1.12	77.43
	Total	2054.52

Table 21

Velocity (m/s) measured at each point on the cross section and each depth on June 6, 1979.

Distance from Left Bank (m)	Velocity Measured at 20% of Total Depth	50%	80%
20	1.36	1.13	.67
50	2.03	1.54	1.48
80	2.47	2.36	1.82
110	2.26	2.16	1.66
140	2.03	1.95	1.62
170	1.12	1.15	1.11

Table 22

NAQUADAT report of water quality parameters measured in samples collected on the cross section at Waneta on June 6, 1979. Concentrations of most substances are expressed in mg/L.

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2	R3 1340-1357	R4	R5 1250-1309	R6
PARAMETER: 02011 - COLOUR APPARENT - REL. UNITS						
.2	5.	--	5.	--	5.	--
.5	5.	--	5.	--	5.	--
.8	5.	--	10.	--	5.	--
BANK	10.	5.	5.	5.	5.	5.
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 02041 - SPECIFIC CONDUCT. - USIE/CM						
.2	137.	--	138.	--	137.	--
.5	137.	--	138.	--	137.	--
.8	138.	--	138.	--	138.	--
BANK	138.	138.	137.	138.	137.	137.
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 02061 - TEMP. WATER - DEG.C.						
.2	18.5	--	18.4	--	18.8	--
.5	18.6	--	18.6	--	19.3	--
.8	18.6	--	18.6	--	19.2	--
BANK	19.1	19.1	19.2	19.4	19.3	19.2
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2	R3 1340-1357	R4	R5 1250-1309	R6
PARAMETER: 02073 - TURBIDITY - JTU						
.2	1.50	--	3.30	--	1.20	--
.5	1.60	--	1.00	--	1.00	--
.8	1.30	--	1.30	--	1.00	--
BANK	1.30	1.00	1.00	1.20	1.00	1.10
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 10101 - ALKALINITY TOTAL - MG/L						
.2	50.6	--	50.3	--	51.4	--
.5	50.6	--	50.5	--	50.7	--
.8	50.9	--	50.9	--	51.3	--
BANK	50.8	51.0	50.8	51.8	50.7	51.6
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 10151 - ALKALINITY PHENOL PHTHALEIN - MG/L						
.2	.0	--	.0	--	.0	--
.5	.0	--	.0	--	.0	--
.8	.0	--	.0	--	.0	--
BANK	.0	.0	.0	.0	.0	.0
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME / DEPTH	R1 1431-1449	R2	R3 1340-1357	R4	R5 1250-1309	R6
PARAMETER: 10301 - PH - PH UNITS						
.2	7.60	--	7.80	--	7.80	--
.5	7.70	--	7.60	--	7.60	--
.8	7.80	--	7.80	--	7.70	--
BANK	7.90	7.80	7.70	7.80	7.70	7.90
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 10401 - RESIDUE NONFILTR. - MG/L						
.2	6.	--	5.	--	4.	--
.5	7.	--	5.	--	3.	--
.8	6.	--	2.	--	4.	--
BANK	3.	4.	5.	4.	2.	6.
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 10451 - RESIDUE FILTERABLE - MG/L						
.2	86.	--	93.	--	89.	--
.5	92.	--	92.	--	91.	--
.8	88.	--	88.	--	87.	--
BANK	81.	91.	95.	91.	75.	88.
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2	R3 1340-1357	R4	R5 1250-1309	R6
PARAMETER: 10501 - RESIDUE FIXED NONFILTR. - MG/L						
.2	4.	--	3.	--	3.	--
.5	5.	--	4.	--	2.	--
.8	5.	--	1.	--	4.	--
BANK	1.	3.	3.	3.	2.	4.
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 10551 - RESIDUE FIXED FILTERABLE - MG/L						
.2	59.	--	65.	--	61.	--
.5	60.	--	58.	--	53.	--
.8	60.	--	64.	--	61.	--
BANK	58.	58.	65.	62.	55.	61.
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 10603 - HARDNESS TOTAL - MG/L						
.2	65.4	--	67.0	--	65.6	--
.5	65.0	--	66.0	--	66.0	--
.8	66.6	--	66.0	--	65.4	--
BANK	65.9	65.0	66.0	65.6	65.6	65.4
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME / DEPTH	R1 1431-1449	R2	R3 1340-1357	R4	R5 1250-1309	R6
PARAMETER: 11103 - SODIUM DISSOLVED - MG/L						
.2	1.5	--	1.4	--	1.5	--
.5	1.4	--	1.4	--	1.4	--
.8	1.4	--	1.4	--	1.4	--
BANK	1.5	1.5	1.5	1.4	1.4	1.4
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 12101 - MAGNESIUM DISSOLVED (CALCD.) - MG/L						
.2	4.1	--	4.4	--	4.1	--
.5	4.2	--	4.2	--	4.0	--
.8	4.2	--	4.0	--	4.1	--
BANK	4.3	4.0	4.2	4.3	4.1	4.1
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 14105 - SILICA REACTIVE - MG/L						
.2	4.2	--	4.2	--	4.2	--
.5	4.6	--	4.2	--	4.2	--
.8	4.6	--	4.2	--	4.2	--
BANK	4.2	4.2	4.2	4.2	4.2	4.2
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2	R3 1340-1357	R4	R5 1250-1309	R6
PARAMETER: 17205 - CHLORIDE DISSOLVED - MG/L						
.2	.9	--	.9	--	1.0	--
.5	.9	--	1.0	--	1.0	--
.8	1.0	--	.9	--	1.0	--
BANK	1.1	1.0	1.0	1.0	1.0	1.0
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 19103 - POTASSIUM DISSOLVED - MG/L						
.2	.6	--	.5	--	.6	--
.5	.5	--	.5	--	.5	--
.8	.5	--	.5	--	.5	--
BANK	.5	.1	.5	.5	.5	.5
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 33304 - ARSENIC EXTRBLE. - MG/L						
.2	.0005	--	.0004	--	.0004	--
.5	.0006	--	.0005	--	.0005	--
.8	.0005	--	.0004	--	.0005	--
BANK	.0003	.0006	.0004	.0006	.0006	.0005
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2	R3 1340-1357	R4	R5 1250-1309	R6
PARAMETER: 34302 - SELENIUM EXTRBLE. - MG/L						
.2	.0002	--	.0002	--	.0002	--
.5	.0002	--	.0002	--	.0003	--
.8	.0002	--	.0002	--	.0002	--
BANK	.0002	.0002	.0002	.0002	.0002	.0002
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 80311 - MERCURY EXTRBLE. - UG/L						
.2	L.05	L.05	L.05	L.05	L.05	L.05
.5	L.05	L.05	L.05	L.05	L.05	L.05
.8	L.05	L.05	L.05	L.05	L.05	L.05
BANK	L.05	L.05	L.05	L.05	L.05	L.05
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME / DEPTH	R1 1431-1449	R2 1409-1422	R3 1340-1357	R4 1319-1332	R5 1250-1309	R6 1230-1240
PARAMETER: 07110 - NITROGEN DISSOLVED NO3 & NO2 - MG/L						
.2	.040	.042	.044	.043	.045	.045
	.041	.044	.043	.043	.044	.044
	.042	.043	.043	.043	.043	.044
.5	.043	.043	.043	.043	.044	.044
	.043	.043	.043	.044	.044	.043
	.043	.045	.043	.044	.044	.043
.8	.043	.043	.043	.044	.044	.044
	.043	.047	.043	.045	.045	.045
	.043	.045	.043	.044	.044	.043
BANK	.045	.044	.044	.043	.043	.044
	.044	.045	.044	.042	.045	.042
	.044	.044	.044	.043	.043	.042
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 07557 - NITROGEN DISSOLVED AMMONIA - MG/L						
.2	.052	.064	.080	.085	.082	.072
	.053	.064	.081	.084	.082	.069
	.052	.065	.081	.084	.082	.068
.5	.060	.070	.083	.084	.084	.068
	.057	.072	.082	.087	.081	.065
	.061	.066	.083	.085	.083	.063
.8	.064	.073	.086	.085	.082	.067
	.061	.074	.084	.086	.082	.065
	.064	.070	.080	.086	.081	.061
BANK	.060	.075	.079	.082	.065	.060
	.060	.076	.080	.079	.071	.054
	.060	.073	.080	.076	.067	.053
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2 1409-1422	R3 1340-1357	R4 1319-1332	R5 1250-1309	R6 1230-1240
PARAMETER: 07651 - NITROGEN DISSOLVED - MG/L						
.2	.110	.121	.138	.153	.158	.157
	.115	.126	.143	.138	.158	.147
	.110	.126	.138	.143	.168	.153
.5	.116	.122	.148	.153	.138	.147
	.111	.157	.146	.154	.138	.146
	.116	.154	.148	.154	.148	.151
.8	.121	.137	.159	.159	.153	.127
	.116	.127	.148	.164	.153	.117
	.116	.122	.153	.159	.158	.126
BANK	.126	.138	.133	.138	.122	.121
	.126	.138	.138	.133	.127	.120
	.131	.142	.138	.128	.122	.120
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 09106 - FLUORIDE DISSOLVED - MG/L						
.2	.174	.189	.189	.177	.188	.179
	.187	.188	.192	.181	.185	.179
	.187	.192	.182	.170	.181	.180
.5	.185	.183	.188	.172	.190	.180
	.182	.178	.190	.180	.188	.181
	.180	.182	.178	.182	.192	.182
.8	.188	.189	.168	.182	.188	.188
	.189	.191	.174	.186	.172	.170
	.190	.192	.172	.185	.180	.181
BANK	.188	.188	.260	.178	.180	.180
	.189	.188	.195	.178	.178	.180
	.189	.185	.189	.179	.179	.179
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME / DEPTH	R1 1431-1449	R2 1409-1422	R3 1340-1357	R4 1319-1332	R5 1250-1309	R6 1230-1240
PARAMETER: 15102 - PHOSPHORUS TOTAL DISSOLVED - MG/L						
.2	.044	--	.040	--	.035	--
	.046	--	.040	--	.036	--
	.046	--	.040	--	.035	--
.5	.044	--	.039	--	.035	--
	.043	--	.039	--	.034	--
	.043	--	.039	--	.037	--
.8	.041	--	.038	--	.033	--
	.041	--	.039	--	.032	--
	.041	--	.039	--	.032	--
BANK	.042	.038	.036	.034	.032	.032
	.042	.038	.036	.035	.033	.033
	.042	.038	.037	.035	.033	.033
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 15406 - PHOSPHORUS TOTAL - MG/L						
.2	.066	.058	.059	.055	.052	.048
	.060	.057	.056	.055	.052	.049
	.060	.060	.057	.054	.052	--
.5	.057	.066	.057	.054	.056	.050
	.058	.064	.053	.054	.051	.066
	.060	.070	.055	.065	.051	.049
.8	.058	.076	.055	.055	.062	.047
	.065	.063	.054	.054	.050	.048
	.064	.058	.056	.054	.050	.046
BANK	.059	.064	.052	.052	.051	.047
	.057	.055	.056	.054	.048	.051
	.050	.054	.052	.052	.049	.050
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2 1409-1422	R3 1340-1357	R4 1319-1332	R5 1250-1309	R6 1230-1240
PARAMETER: 16306 - SULPHATE DISSOLVED - MG/L						
.2	15.2	15.2	15.2	15.1	15.2	15.3
	15.2	15.2	15.2	15.1	15.0	15.3
	15.5	15.2	15.2	15.1	15.7	15.3
.5	15.4	15.6	15.2	15.1	15.6	15.2
	15.4	15.1	15.2	15.1	15.6	15.3
	15.4	15.1	15.2	15.2	15.4	15.3
.8	15.4	15.1	15.1	15.1	15.4	15.3
	15.3	15.2	15.1	15.2	15.3	15.2
	15.3	15.2	15.2	15.2	15.3	15.1
BANK	15.7	15.6	15.8	15.5	15.4	15.1
	15.7	15.7	15.7	15.1	15.3	15.1
	15.8	15.7	15.7	15.5	15.4	15.2
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 20101 - CALCIUM DISSOLVED - MG/L						
.2	20.5	21.9	24.2	23.6	19.1	26.6
	22.8	22.5	25.6	22.0	20.9	28.9
	21.9	22.7	23.2	25.7	22.3	29.3
.5	23.4	21.5	23.0	24.2	22.3	29.3
	30.1	25.8	27.3	22.1	27.1	21.2
	26.2	22.7	24.1	23.0	27.1	20.0
.8	31.2	22.4	22.3	21.9	32.6	20.3
	23.4	25.9	22.8	23.0	27.3	19.8
	22.7	22.3	22.0	25.0	27.3	19.9
BANK	20.2	19.5	19.5	19.9	19.5	20.6
	19.9	19.8	19.9	20.3	19.5	19.5
	20.4	19.9	18.6	20.3	19.9	19.9
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2 1409-1422	R3 1340-1357	R4 1319-1332	R5 1250-1309	R6 1230-1240
PARAMETER: 25004 - MANGANESE TOTAL - MG/L						
.2	.01	L.01	.01	L.01	L.01	.01
	.01	.01	.01	.01	L.01	.01
	.01	L.01	L.01	.01	L.01	.01
.5	.01	.01	L.01	L.01	.01	L.01
	.01	.01	.01	L.01	L.01	.01
	.01	.02	L.01	.01	L.01	L.01
.8	.01	.02	.01	L.01	.01	L.01
	.01	.04	.01	.01	.01	L.01
	.01	.01	.01	.01	.01	.01
BANK	.02	.01	.01	.01	.01	L.01
	.01	.01	L.01	L.01	.01	.01
	.01	.01	.01	L.01	L.01	.01
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 26004 - IRON TOTAL - MG/L						
.2	.18	.11	.15	.11	.10	.08
	.16	.14	.13	.16	.15	.09
	.13	.14	.11	.12	.11	.21
.5	.16	.40	.15	.11	.11	.09
	.23	.39	.15	.12	.15	.16
	.18	.25	.17	.11	.11	.20
.8	.30	.80	.17	.16	.14	.10
	.15	1.90	.26	.17	.19	.14
	.33	.54	.22	.14	.13	.10
BANK	.25	.08	.08	.07	.09	.10
	.09	.18	.06	.07	.08	.07
	.07	.09	.19	.07	.28	.07
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2 1409-1422	R3 1340-1357	R4 1319-1332	R5 1250-1309	R6 1230-1240
PARAMETER: 28002 - NICKEL TOTAL - MG/L						
.2	L.001	.001	L.001	L.001	.001	L.001
	L.001	L.001	.001	L.001	.002	.001
	L.001	L.001	L.001	L.001	.002	L.001
.5	L.001	L.001	L.001	L.001	.002	L.001
	L.001	L.001	L.001	L.001	.001	L.001
	.002	L.001	L.001	L.001	.001	.001
.8	L.001	L.001	L.001	L.001	.001	L.001
	L.001	L.001	L.001	L.001	.001	L.001
	L.001	.001	L.001	.001	L.001	L.001
BANK	L.001	.001	L.001	L.001	L.001	.002
	.001	.001	.001	L.001	L.001	L.001
	L.001	.001	L.001	L.001	L.001	L.001
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 29005 - COPPER TOTAL - MG/L						
.2	.004	.003	.004	.002	.003	.003
	.004	.004	.004	.005	.002	.004
	.006	.004	.003	.002	.003	.003
.5	.006	.007	.004	.003	.003	.008
	.004	.006	.003	.003	.004	.003
	.008	.006	.003	.002	.007	.008
.8	.008	.011	.005	.006	.002	.003
	.008	.02	.004	.002	.003	.003
	.008	.009	.004	.003	.004	.004
BANK	.009	.003	.006	.003	.003	.003
	.004	.006	.003	.002	.003	.004
	.005	.003	.003	.003	.003	.004
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2 1409-1422	R3 1340-1357	R4 1319-1332	R5 1250-1309	R6 1230-1240
PARAMETER: 30004 - ZINC TOTAL - MG/L						
.2	.05	.04	.04	.05	.04	.04
	.04	.04	.04	.05	.05	.05
	.05	.04	.05	.04	.04	.05
.5	.05	.07	.05	.04	.04	.05
	.06	.06	.06	.05	.05	.05
	.06	.06	.05	.04	.04	.05
.8	.06	.09	.05	.04	.05	.05
	.05	.22	.06	.05	.05	.05
	.08	.09	.06	05	.05	.05
BANK	.04	.04	.04	.04	.04	.04
	.03	.04	.04	.04	.04	.04
	.03	.04	.04	.04	.04	.04
TIME	1452	1422	1352	1322	1252	1222
PARAMETER: 48002 - CADMIUM TOTAL - MG/L						
.2	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
.5	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
.8	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
BANK	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
TIME	1452	1422	1352	1322	1252	1222

POINTS ON THE CROSS SECTION

DATE: 790606

SAMPLING TIME DEPTH	R1 1431-1449	R2 1409-1422	R3 1340-1357	R4 1319-1332	R5 1250-1309	R6 1230-1240
PARAMETER: 82002 - LEAD TOTAL - MG/L						
.2	.006	.006	.005	.005	.005	.005
	.005	.006	.005	.006	.005	.008
	.006	.005	.005	.007	.005	.007
.5	.007	.007	.008	.006	.006	.009
	.005	.007	.005	.005	.007	.007
	.006	.007	.006	.006	.007	.010
.8	.006	.006	.005	.006	.006	.008
	.005	.008	.006	.005	.006	.008
	.007	.006	.006	.005	.005	.011
BANK	.008	.004	.005	.006	.006	.009
	.008	.007	.006	.004	.006	.006
	.008	.006	.005	.006	.007	.007
TIME	1452	1422	1352	1322	1252	1222

Table 23

Mean velocity (m/s) and discharge (m^3/s) measured at each point on the cross section on July 5, 1979.

Distance from Left Bank (m)	Velocity (Mean in Vertical)	Discharge
20	-	-
50	1.27	267.69
80	1.86	358.96
110	1.93	349.51
140	1.70	254.42
170	.76	26.83
	Total	1257.43

Table 24

Velocity (m/s) measured at each point on the cross section and each depth on July 5, 1979.

Distance from Left Bank (m)	Velocity Measured at 20% of Total Depth	50%	80%
20	-	-	-
50	1.39	1.23	1.16
80	2.42	2.12	1.31
110	2.21	1.92	1.66
140	1.88	1.51	1.51
170	.84	.95	.68

Table 25

NAQUADAT report of water quality parameters measured in samples collected from six points and three depths on the cross section at Waneta on July 5, 1979. Concentrations of most substances are expressed in mg/L.

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME / DEPTH	R1 1353-1415	R2	R3 1307-1324	R4	R5 1217-1235	R6
PARAMETER: 02011 - COLOUR APPARENT - REL. UNITS						
.2	5.	--	5.	--	L5.	--
.5	5.	--	5.	--	5.	--
.8	5.	--	5.	--	5.	--
BANK	--	5.	5.	L5.	5.	5.
TIME		1349	1319	1249	1219	1149
PARAMETER: 02041 - SPECIFIC CONDUCT. - USIE/CM						
.2	131.	--	126.	--	126.	--
.5	126.	--	126.	--	126.	--
.8	126.	--	124.	--	126.	--
BANK	--	128.	128.	127.	126.	128.
TIME		1349	1319	1249	1219	1149
PARAMETER: 02061 - TEMP. WATER - DEG.C.						
.2	19.8	--	20.1	--	19.9	--
.5	19.9	--	20.1	--	20.1	--
.8	20.1	--	20.0	--	20.1	--
BANK	--	20.1	20.1	20.0	19.9	20.1
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME DEPTH	R1 1353-1415	R2	R3 1307-1324	R4	R5 1217-1235	R6
PARAMETER: 02073 - TURBIDITY - JTU						
.2	.58	--	.67	--	.55	--
.5	.63	--	.62	--	.70	--
.8	.74	--	.58	--	.50	--
BANK	--	.70	.77	.85	.70	30.00
TIME		1349	1319	1249	1219	1149
PARAMETER: 10101 - ALKALINITY TOTAL - MG/L						
.2	51.9	--	51.8	--	52.3	--
.5	51.8	--	52.2	--	52.8	--
.8	52.5	--	51.7	--	52.3	--
BANK	--	52.7	52.6	52.1	52.3	52.3
TIME		1349	1319	1249	1219	1149
PARAMETER: 10151 - ALKALINITY PHENOL PHTHALEIN - MG/L						
.2	.0	--	.0	--	.0	--
.5	.0	--	.0	--	.0	--
.8	.0	--	.0	--	.0	--
BANK	--	.0	.0	.0	.0	.0
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME / DEPTH	R1 1353-1415	R2	R3 1307-1324	R4	R5 1217-1235	R6
PARAMETER: 10301 - PH - PH UNITS						
.2	7.70	--	7.90	--	7.60	--
.5	7.80	--	7.70	--	7.70	--
.8	7.80	--	7.80	--	7.60	--
BANK	--	7.90	7.90	7.70	7.60	7.70
TIME		1349	1319	1249	1219	1149
PARAMETER: 10401 - RESIDUE NONFILTR. - MG/L						
.2	2.	--	2.	--	4.	--
.5	2.	--	3.	--	3.	--
.8	2.	--	3.	--	3.	--
BANK	--	2.	4.	3.	6.	64.
TIME		1349	1319	1249	1219	1149
PARAMETER: 10451 - RESIDUE FILTERABLE - MG/L						
.2	74.	--	76.	--	61.	--
.5	76.	--	79.	--	74.	--
.8	74.	--	75.	--	94.	--
BANK	--	93.	87.	88.	92.	91.
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME DEPTH	R1 1353-1415	R2	R3 1307-1324	R4	R5 1217-1235	R6
PARAMETER: 10501 - RESIDUE FIXED NONFILTR. - MG/L						
.2	L1.	--	L1.	--	2.	--
.5	L1.	--	2.	--	2.	--
.8	L1.	--	1.	--	2.	--
BANK	--	L1.	L1.	2.	3.	61.
TIME		1349	1319	1249	1219	1149
PARAMETER: 10551 - RESIDUE FIXED FILTERABLE - MG/L						
.2	54.	--	62.	--	52.	--
.5	59.	--	60.	--	61.	--
.8	56.	--	56.	--	68.	--
BANK	--	73.	72.	61.	61.	58.
TIME		1349	1319	1249	1219	1149
PARAMETER: 10603 - HARDNESS TOTAL - MG/L						
.2	61.2	--	61.6	--	61.2	--
.5	61.2	--	59.2	--	61.2	--
.8	61.2	--	60.6	--	59.4	--
BANK	--	60.2	59.2	61.2	59.2	61.8
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME / DEPTH	R1 1353-1415	R2	R3 1307-1324	R4	R5 1217-1235	R6
PARAMETER: 11103 - SODIUM DISSOLVED - MG/L						
.2	1.3	--	1.4	--	1.4	--
.5	1.4	--	1.4	--	1.3	--
.8	1.4	--	1.4	--	1.4	--
BANK	--	1.4	1.3	1.3	1.3	1.3
TIME		1349	1319	1249	1219	1149
PARAMETER: 12101 - MAGNESIUM DISSOLVED (CALCD.) - MG/L						
.2	3.8	--	3.9	--	3.8	--
.5	3.6	--	3.5	--	3.1	--
.8	3.5	--	3.4	--	3.5	--
BANK	--	3.5	3.2	4.1	3.3	3.9
TIME		1349	1319	1249	1219	1149
PARAMETER: 14105 - SILICA REACTIVE - MG/L						
.2	4.0	--	4.0	--	4.0	--
.5	4.0	--	4.0	--	4.0	--
.8	4.0	--	4.0	--	4.0	--
BANK	--	4.0	4.0	4.0	4.0	4.0
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME DEPTH	R1 1353-1415	R2	R3 1307-1324	R4	R5 1217-1235	R6
PARAMETER: 17206 - CHLORIDE DISSOLVED - MG/L						
.2	.9	--	.8	--	.8	--
.5	.8	--	.8	--	.9	--
.8	.9	--	.9	--	.9	--
BANK	--	1.0	.9	.9	.8	.9
TIME		1349	1319	1249	1219	1149
PARAMETER: 19103 - POTASSIUM DISSOLVED - MG/L						
.2	.6	--	.6	--	.6	--
.5	.6	--	.6	--	.6	--
.8	.6	--	.6	--	.6	--
BANK	--	.7	.6	.6	.7	.6
TIME		1349	1319	1249	1219	1149
PARAMETER: 33304 - ARSENIC EXTRBLE. - MG/L						
.2	.0004	--	.0005	--	.0004	--
.5	.0003	--	.0005	--	.0004	--
.8	.0004	--	.0006	--	.0006	--
BANK	--	.0004	.0004	.0005	.0005	.0007
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME / DEPTH	R1 1353-1415	R2	R3 1307-1324	R4	R5 1217-1235	R6
PARAMETER: 34302 - SELENIUM EXTRBLE. - MG/L						
.2	.0005	--	.0005	--	.0003	--
.5	.0006	--	.0005	--	.0003	--
.8	.0005	--	.0003	--	.0004	--
BANK	--	.0005	.0004	.0004	.0004	.0005
TIME		1349	1319	1249	1219	1149
PARAMETER: 80311 - MERCURY EXTRBLE. - UG/L						
.2	.11	.08	.05	L.05	L.05	L.05
.5	.12	.05	L.05	L.05	L.05	L.05
.8	.08	.05	L.05	L.05	L.05	L.05
BANK	--	.07	L.05	L.05	L.05	L.05
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME DEPTH	R1 1353-1415	R2 1336-1347	R3 1307-1324	R4 1245-1300	R5 1217-1235	R6 1155-1213
PARAMETER: 07110 - NITROGEN DISSOLVED NO3 & NO2 - MG/L						
.2	.064	.065	.065	.066	.067	.066
	.069	.065	.065	.066	.067	.066
	.065	.066	.064	.066	.067	.066
.5	.065	.066	.066	.066	.067	.067
	.065	.066	.067	.066	.067	.066
	.065	.065	.066	.066	.067	.067
.8	.065	.065	.066	.066	.067	.067
	.065	.065	.066	.067	.067	.067
	.065	.065	.066	.067	.066	.067
BANK	--	.068	.068	.068	.069	.071
	--	.068	.069	.068	.069	.069
	--	.071	.069	.068	.069	.069
TIME		1349	1319	1249	1219	1149
PARAMETER: 07557 - NITROGEN DISSOLVED AMMONIA - MG/L						
.2	.030	.033	.038	.037	.027	.029
	.032	.034	.038	.035	.034	.030
	.034	.035	.032	.033	.030	.030
.5	.035	.035	.034	.035	.032	.030
	.035	.035	.035	.036	.032	.031
	.033	.034	.031	.036	.029	.031
.8	.033	.035	.038	.031	.033	.030
	.035	.035	.037	.031	.035	.028
	.035	.035	.030	.033	.034	.030
BANK	--	.030	.034	.030	.032	.033
	--	.034	.035	.034	.034	.034
	--	.033	.033	.034	.034	.033
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME / DEPTH	R1 1353-1415	R2 1336-1347	R3 1307-1324	R4 1245-1300	R5 1217-1235	R6 1155-1213
PARAMETER: 07651 - NITROGEN DISSOLVED - MG/L						
.2	.153	.148	.149	.149	.158	.158
	.148	.153	.154	.153	.158	.153
	.153	.153	.153	.153	.158	.153
.5	.143	.148	.153	.153	.153	.158
	.143	.153	.153	.153	.153	.158
	.153	.153	.153	.158	.153	.153
.8	.153	.143	.149	.153	.153	.168
	.148	.143	.154	.158	.158	.173
	.148	.143	.153	.158	.158	.168
BANK	--	.153	.163	.153	.153	.158
	--	.153	.153	.153	.153	.153
	--	.158	.153	.148	.148	.158
TIME		1349	1319	1249	1219	1149
PARAMETER: 09106 - FLUORIDE DISSOLVED - MG/L						
.2	.103	.110	.107	.107	.104	.108
	.102	.112	.108	.109	.104	.108
	.102	.119	.104	.104	.106	.107
.5	.103	.114	.109	.108	.105	.108
	.106	.108	.108	.106	.103	.109
	.103	.109	.107	.108	.104	.108
.8	.103	.108	.107	.107	.103	.109
	.103	.109	.107	.107	.103	.111
	.110	.108	.107	.108	.103	.113
BANK	--	.113	.103	.102	.107	.110
	--	.102	.105	.102	.107	.109
	--	.102	.102	.104	.106	.108
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME DEPTH	R1 1353-1415	R2 1336-1347	R3 1307-1324	R4 1245-1300	R5 1217-1235	R6 1155-1213
PARAMETER: 15102 - PHOSPHORUS TOTAL DISSOLVED - MG/L						
.2	.006	--	.003	--	.006	--
	.006	--	.003	--	.006	--
	.005	--	.005	--	.006	--
.5	.005	--	.006	--	.007	--
	.005	--	.007	--	.006	--
	.005	--	.006	--	.006	--
.8	.005	--	.006	--	.006	--
	.005	--	.006	--	.007	--
	.006	--	.006	--	.005	--
BANK	--	.007	.007	.006	.008	.008
	--	.008	.006	.006	.007	.008
	--	.004	.006	.006	.006	.008
TIME		1349	1319	1249	1219	1149
PARAMETER: 15406 - PHOSPHORUS TOTAL - MG/L						
.2	.016	.017	.016	.014	.014	.021
	.017	.016	.016	.014	.014	.021
	.017	.017	.015	.014	.016	.021
.5	.017	.017	.015	.014	.015	.026
	.016	.017	.015	.014	.015	.025
	.016	.016	.015	.016	.015	.026
.8	.017	.016	.015	.014	.015	.018
	.016	.016	.015	.014	.016	.020
	.021	.016	.014	.014	.016	.018
BANK	--	.014	.015	.016	.018	.086
	--	.014	.014	.017	.016	.082
	--	.015	.015	.023	.015	.052
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME / DEPTH	R1 1353-1415	R2 1336-1347	R3 1307-1324	R4 1245-1300	R5 1217-1235	R6 1155-1213
PARAMETER: 16306 - SULPHATE DISSOLVED - MG/L						
.2	8.8	8.8	9.6	9.5	9.6	9.7
	8.8	8.8	9.7	9.5	9.6	9.7
	9.0	8.7	9.6	9.6	9.7	9.7
.5	8.8	8.8	9.6	9.6	9.6	9.7
	8.8	8.6	9.6	9.6	9.5	9.7
	8.7	9.5	9.6	9.7	9.6	9.7
.8	8.8	9.6	9.6	9.5	9.6	9.7
	8.8	9.6	9.6	9.6	9.6	9.7
	9.1	9.6	9.7	9.6	9.7	9.7
BANK	--	9.9	9.9	9.9	9.9	9.7
	--	9.9	9.9	9.9	9.8	9.8
	--	9.9	9.9	9.9	9.9	9.9
TIME		1349	1319	1249	1219	1149
PARAMETER: 20101 - CALCIUM DISSOLVED - MG/L						
.2	18.4	18.7	19.7	19.4	18.0	17.8
	18.4	18.5	18.0	18.2	18.0	17.7
	18.6	20.5	18.7	18.4	18.2	17.7
.5	18.7	18.1	18.7	18.0	18.0	18.0
	18.3	18.9	18.4	18.0	17.6	18.0
	18.3	18.7	18.4	18.2	18.0	19.4
.8	19.1	19.1	17.4	18.4	18.4	18.0
	18.6	12.1	18.7	18.1	18.3	18.6
	20.2	18.4	18.9	18.4	18.4	18.5
BANK	--	17.9	18.1	18.0	18.4	18.7
	--	18.2	18.0	18.4	17.6	18.4
	--	18.4	18.0	18.1	18.0	18.0
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 780705

SAMPLING TIME / DEPTH	R1 1353-1415	R2 1336-1347	R3 1307-1324	R4 1245-1300	R5 1217-1235	R6 1155-1213
PARAMETER: 25004 - MANGANESE TOTAL - MG/L						
.2	L.01	L.01	L.01	L.01	L.01	L.01
	L.01	L.01	L.01	L.01	L.01	L.01
	L.01	L.01	L.01	L.01	L.01	L.01
.5	L.01	L.01	.01	L.01	L.01	L.01
	L.01	L.01	L.01	L.01	L.01	L.01
	L.01	L.01	L.01	L.01	L.01	L.01
.8	L.01	L.01	L.01	L.01	L.01	L.01
	L.01	.01	.01	L.01	L.01	L.01
	L.01	L.01	L.01	L.01	L.01	L.01
BANK	--	L.01	L.01	.01	L.01	L.01
	--	L.01	L.01	L.01	L.01	L.01
	--	L.01	L.01	L.01	L.01	L.01
TIME		1349	1319	1249	1219	1149
PARAMETER: 26004 - IRON TOTAL - MG/L						
.2	.07	.09	.13	.08	.08	.12
	.07	.06	.14	.09	.06	.12
	.10	.08	.11	.10	.06	.16
.5	.06	.07	.09	.11	.05	.21
	.06	.21	.16	.10	.06	.11
	.07	.13	.23	.10	.13	.13
.8	.08	.21	.16	.07	.21	.11
	.18	.34	.15	.11	.07	.13
	.06	.21	.15	.09	.09	.23
BANK	--	.06	.06	.06	.07	.21
	--	.07	.05	.06	.05	.20
	--	.06	.06	.05	.07	.18
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME / DEPTH	R1 1353-1415	R2 1336-1347	R3 1307-1324	R4 1245-1300	R5 1217-1235	R6 1155-1213
PARAMETER: 28002 - NICKEL TOTAL - MG/L						
.2	.001	L.001	L.001	L.001	L.001	L.001
	.001	L.001	L.001	L.001	L.001	L.001
	.001	L.001	L.001	L.001	L.001	L.001
.5	.002	L.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	L.001	L.001
.8	L.001	L.001	L.001	L.001	L.001	L.001
	L.001	.001	L.001	L.001	L.001	L.001
	L.001	L.001	L.001	L.001	.003	L.001
BANK	--	L.001	.001	.001	L.001	L.001
	--	.002	L.001	L.001	L.001	L.001
	--	L.001	L.001	L.001	L.001	L.001
TIME		1349	1319	1249	1219	1149
PARAMETER: 29005 - COPPER TOTAL - MG/L						
.2	.003	.002	.004	.002	.003	.003
	.004	.003	.004	.002	.004	.003
	.003	.002	.002	.002	.003	.002
.5	.003	.005	.003	.003	.004	.003
	.003	.004	.006	.003	.003	.001
	.004	.004	.005	.003	.003	.002
.8	.004	.008	.004	.003	.003	.003
	.004	.007	.004	.003	.003	.003
	.002	.004	.004	.002	.004	.005
BANK	--	.002	.002	.002	.002	.003
	--	.003	.002	.002	.002	.003
	--	.001	.003	.002	.002	.003
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME DEPTH	R1 1353-1415	R2 1336-1347	R3 1307-1324	R4 1245-1300	R5 1217-1235	R6 1155-1213
PARAMETER: 30005 - ZINC TOTAL - MG/L						
.2	.017	.018	.016	.012	.013	.015
	.017	.016	.020	.014	.012	.016
	.018	.017	.017	.016	.014	.013
.5	.015	.016	.019	.015	.016	.014
	.017	.022	.019	.015	.013	.010
	.014	.03	.029	.016	.014	.015
.8	.018	.021	.029	.015	.013	.015
	.021	.022	.021	.017	.013	.015
	.015	.019	.023	.014	.016	.023
BANK	--	.014	.016	.016	.010	.018
	--	.015	.016	.016	.010	.015
	--	.014	.016	.016	.010	.019
TIME		1349	1319	1249	1219	1149
PARAMETER: 48002 - CADMIUM TOTAL - MG/L						
.2	.0026	.0026	.0009	L.0005	L.0005	L.0005
	.0026	.0026	.0011	L.0005	L.0005	L.0005
	.0028	.0023	.0010	L.0005	L.0005	L.0005
.5	.0023	.0018	.0008	.0010	L.0005	L.0005
	.0026	.0018	.0007	L.0005	L.0005	L.0005
	.0023	.0014	.0007	L.0005	L.0005	.0008
.8	.0022	.0015	.0006	L.0005	L.0005	L.0005
	.0022	.0017	.0005	L.0005	L.0005	L.0005
	.0019	.0016	L.0005	L.0005	L.0005	.0006
BANK	--	.0018	.0008	L.0005	L.0005	L.0005
	--	.0018	.0007	L.0005	L.0005	L.0005
	--	.0017	.0005	L.0005	L.0005	L.0005
TIME		1349	1319	1249	1219	1149

POINTS ON THE CROSS SECTION

DATE: 790705

SAMPLING TIME DEPTH	R1 1353-1415	R2 1336-1347	R3 1307-1324	R4 1245-1300	R5 1217-1235	R6 1155-1213
PARAMETER: 82002 - LEAD TOTAL - MG/L						
.2	.041	.041	.017	.005	.005	.006
	.040	.040	.017	.006	.005	.007
	.045	.039	.016	.005	.005	.007
.5	.037	.030	.014	.005	.006	.005
	.041	.030	.012	.005	.005	.003
	.036	.028	.012	.007	.006	.009
.8	.035	.029	.010	.006	.004	.006
	.035	.029	.010	.006	.005	.007
	.031	.030	.006	.006	.006	.010
BANK	--	.022	.010	.028	.004	.010
	--	.024	.008	.004	.004	.008
	--	.021	.008	.004	.004	.011
TIME		1349	1319	1249	1219	1149

Section 3

Time Series Studies

TIME SERIES STUDIES

Five intensive studies lasting from 24 to 94 hours, were undertaken to investigate episodic conditions in the river. Each study was designed to answer a specific question. The purpose and sampling design of each study are discussed below. Parameters measured for each study are summarized in Table 26.

September, 1978 (Table 27)

Monitoring data from the early to mid 1970's had shown sporadically high concentrations of phosphorus and heavy metals at Waneta. In order to document maximum and minimum concentrations and to determine whether there were any patterns in the fluctuations, samples for nutrients, total metals, and major ions were taken at Waneta every 2 hours for 24 hours. Sampling was done by dipping collecting vessels into the river at a wadeable distance from the left bank.

September, 1979 (Tables 28a and b)

Since the September, 1978, data had shown wide fluctuations in phosphorus concentrations (from .004 to .174 mg/L dissolved phosphorus), a further study was designed to monitor the fluctuations in greater detail. Sampling was undertaken downstream from Trail at Waneta and upstream from Trail at Birchbank because Cominco's fertilizer operation at Trail was thought to be the major source of phosphorus.

At Waneta, samples were collected hourly for 72 hours by two ISCO (model no. 1391) automatic samplers (one for phosphorus and one for nitrogen). In addition, periodic quality control samples (3 replicates) were taken by hand dipping containers at a wadeable distance from the left bank. When quality control samples were collected, they were taken as the ISCO samplers were activated. None of the automatically collected samples were filtered. All quality control nitrogen samples were filtered. Six phosphorus samples were taken and three were filtered to provide measurements of both total and dissolved phosphorus.

At Birchbank all samples were collected by dipping the appropriate container at a wadeable distance from the right bank. Three replicate samples for nitrogen and three for total phosphorus were collected hourly. These samples were not filtered. Periodically, an additional three replicate samples for dissolved phosphorus were collected and filtered.

Samples for nutrients and fluorides were also collected along the cross section at Birchbank. Five sampling points were established by dividing the cross section into approximately equal parts. No tag-line was used. Samples were collected at each point by hand-dipping containers from the side of a boat.

May, 1981 (Tables 30a and b)

Cominco planned to modernize its metal extraction processes and to install an acid treatment plant which should reduce the concentrations of metals discharged into the Columbia. In order to evaluate the effectiveness of the new treatment process, it was necessary to have before-treatment data on the concentrations of metals in the river. Thus, samples for total metals were collected hourly for 72 hours at Waneta using a Manning model no. S-4050 automatic sampler. Three replicate samples were collected periodically as quality controls. They were taken by hand dipping appropriate containers at a wadeable distance from the left bank as the automatic sampler was activiated.

To account for any metal inputs upstream from Cominco, samples were also taken at Birchbank. They were collected hourly for 72 hours by an ISCO automatic sampler. Three replicate quality control samples were collected periodically as described above, except that they were taken at a wadeable distance from the right bank.

Metals measured are listed in Table 27.

October, 1983 (Tables 31a and b)
After the acid treatment plant at Cominco had come on line, another 72-hour study of metal concentrations was conducted at Birchbank and Waneta. The sampling design was identical to that of the May, 1981, study except that when quality control samples were taken, an additional 3 replicates were collected and filtered for dissolved metals analyses.

March, 1984 (Tables 32a and b, 33, 34, 35)
In early 1984, Cominco requested a variance order to its permit allowing the discharge of 200 tonnes of sulphuric acid per day. In order to make a decision on the request, it was necessary to evaluate this discharge under low flow conditions.

An experiment was designed for this purpose. Water quality was monitored for 94 hours from March 26 - March 30. During this time, B.C. Hydro and Kootenay Power and Light Co. controlled the flow rates from the Hugh Keenleyside and Brillant Dams. The range of daily discharges at Birchbank from March 26 - March 30 was 717-842 m^3/sec (Water Survey of Canada, unpubl. data). Cominco discharged acid in the following pulses: 1) 200 tonnes/day (15 gal/min) of sulphuric acid from 745-1340 PST on March 27, 2) 200 tonnes/day (15 gal/min) of sulphuric acid from 655-1330 on March 28, and 3) 300 tonnes/day (22 gal/min) of combined sulfuric acid and spent zinc electrolyte from 0510-1350 on March 29.

Sampling design for metals was identical to the sampling design used in October, 1983. Other parameters were also measured. Each time quality control samples were collected, three replicate samples were taken for sulphate and (laboratory) pH analyses. A Hydrolab-8000 automatic monitor and data-logging system (described in detail by Whitfield, 1984) was installed at Waneta. This device measured *in situ* temperature, conductivity, pH and oxidation - reduction potential of the water every 15 minutes throughout the 94-hour

period. Periodically the Hydrolab data logger had to be removed for data retrieval; while this was being done, measurements were taken manually with a parallel analog.

Variability of metals, sulphates, and pH along the cross section at Waneta was also measured. Five sampling points were established by visually dividing the cross section into five approximately equal parts. Three replicate samples were collected by hand-dipping containers from the side of a boat. The cross section was sampled once on March 27 and once on March 29.

Times

Times listed in all of the following tables except NAQUADAT reports are recorded as local time (Pacific Standard or Pacific Daylight, depending upon season).

Table 26

Parameters Measured During the Five Time Series Studies

Parameter	Sept. 1978	Sept. 1979	May 1981	Oct. 1983	March 1984
Total Phosphorus	+	+			
Dissolved Phosphorus	+	+			
Nitrate + Nitrite	+	+			
Ammonia	+	+			
Total Dissolved Nitrogen	+	+			
Particulate Nitrogen	+	+			
Particulate Carbon	+	+			
Fluoride		+			
Sulphate					+
Major Ions, Residues and Physical Parameters	+				+
Total Cd	+		+	+	+
Dissolved Cd				+	+
Total Cu	+		+	+	+
Dissolved Cu				+	+
Total Fe	+			+	+
Dissolved Fe				+	+
Total Mn	+			+	+
Dissolved Mn				+	+
Total Ni	+				
Total Pb	+		+	+	+
Dissolved Pb				+	+
Total Zn	+		+	+	+
Dissolved Zn				+	+
Extractable As			+	+	+
Extractable Se			+	+	+
Extractable Hg	+		+	+	+

Table 27

NAQUADAT detailed report of water quality parameters measured in samples taken at Birchbank and Waneta, September 19 - September 20, 1978. Samples were collected every 2 hours for 24 hours.

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0001
COLUMBIA RIVER BELOW TRAIL, 1.8 KM NORTH OF WANETA POWER DAM, LAT. 49D 1M 39S LONG. 117D 36M 11S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	02011L COLOUR APPARENT REL. UNITS	02041L SPECIFIC CONDUCT. USIE/CM	02061L TEMP. WATER DEG.C.	02073L TURBIDITY JTU	069031 CARBON PARTICULATE C MG/L	069032 CARBON PARTICULATE C MG/L	069033 CARBON PARTICULATE C MG/L	071101 NITROGEN DISSOLVED NO3 & NO2 N MG/L
78-09-19	0915	324	5.	107.0	21.1	.42	.16	.15	.21	.059
	1115	324	5.	106.0	21.1	.34	.19	.25	.23	.060
	1315	324	5.	106.0	21.3	.56	.23	.23	.26	.059
	1515	324	5.	106.0	21.2	.41	.24	.26	.24	.059
	1715	324	5.	106.0	21.1	.42	.16	.18	.15	.061
	1915	324	5.	106.0	21.1	.40	.23	.22	.20	.059
	2115	324	5.	106.0	21.2	.38	.21	.18	.21	.060
	2315	324	5.	107.0	21.3	.36	.22	.21	.20	.060
78-09-20	0115	324	5.	115.0	21.3	.37	.21	.21	.20	.062
	0315	324	5.	111.0	21.2	.64	.20	.21	.21	.062
	0515	324	5.	114.0	21.3	.48	.23	.24	.21	.062
	0715	324	5.	114.0	21.4	.44	.21	.21	.18	.064
	0915	324	5.	112.0	22.2	.58	.20	.22	.21	.062

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	071102 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071103 NITROGEN DISSOLVED NO3 & NO2 N MG/L	075571 NITROGEN DISSOLVED AMMONIA N MG/L	075572 NITROGEN DISSOLVED AMMONIA N MG/L	075573 NITROGEN DISSOLVED AMMONIA N MG/L	076551 NITROGEN TOTAL DISSOLVED N MG/L	076552 NITROGEN TOTAL DISSOLVED N MG/L	076553 NITROGEN TOTAL DISSOLVED N MG/L
78-09-19	0915	324	.059	.059	.029	.033	.032	.10	.10	.10
	1115	324	.059	.061	.036	.027	.036	.10	.10	.11
	1315	324	.060	.059	.032	.035	.034	.11	.11	.11
	1515	324	.059	.059	.029	.028	.032	.11	.10	.11
	1715	324	.059	.059	.032	.034	.034	.11	.14	.11
	1915	324	.060	.060	.034	.034	.032	.11	.11	.11
	2115	324	.063	.060	.033	.036	.035	.11	.11	.11
	2315	324	.060	.060	.025	.024	.026	.11	.11	.11
78-09-20	0115	324	.060	.060	.025	.028	.021	.13	.11	.11
	0315	324	.061	.062	.023	.023	.025	.12	.11	.11
	0515	324	.062	.063	.022	.025	.027	.11	.11	.12
	0715	324	.062	.062	.033	.029	.026	.12	.11	.11
	0915	324	.062	.062	.029	.026	.025	.11	.11	.11

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0001 LAT. 49D 1M 39S LONG. 117D 36M 11S
COLUMBIA RIVER BELOW TRAIL, 1.8 KM NORTH OF WANETA POWER DAM, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	079031 NITROGEN PARTICULATE N MG/L	079032 NITROGEN PARTICULATE N MG/L	079033 NITROGEN PARTICULATE N MG/L	09106L FLUORIDE DISSOLVED F MG/L	10101L ALKALINITY TOTAL CACO3 MG/L	10151L ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	10301L PH PH UNITS	10401L RESIDUE NONFILTR. MG/L
78-09-19	0915	324	.021	.015	.025	.093	43.0	.0	7.5	L1.
	1115	324	.021	.031	.026	.090	42.0	.0	7.5	2.
	1315	324	.027	.026	.032	.082	41.5	.0	7.5	2.
	1515	324	.029	.032	.030	.067	42.5	.0	7.6	2.
	1715	324	.017	.021	.017	.069	40.4	.0	7.6	L1.
	1915	324	.028	.026	.025	.080	42.0	.0	7.8	2.
	2115	324	.025	.027	.024	.072	42.0	.0	7.5	L1.
	2315	324	.027	.024	.025	.068	41.0	.0	7.6	L1.
78-09-20	0115	324	.026	.027	.024	.120	41.0	.0	7.5	L1.
	0315	324	.025	.026	.026	.103	41.0	.0	7.5	L1.
	0515	324	.026	.028	.025	.110	41.0	.0	7.6	L1.
	0715	324	.025	.024	.021	.108	41.0	.0	7.6	L1.
	0915	324	.023	.026	.024	.122	41.0	.0	7.5	L1.

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10451L RESIDUE FILTERABLE MG/L	10501L RESIDUE FIXED NONFILTR. MG/L	10551L RESIDUE FIXED FILTERABLE MG/L	10603L HARDNESS TOTAL CACO3 MG/L	11103L SODIUM DISSOLVED NA MG/L	12101L MAGNESIUM DISSOLVED (CALCD.) MG MG/L	14105L SILICA REACTIVE SIO2 MG/L	151021 PHOSPHORUS TOTAL DISSOLVED P MG/L
78-09-19	0915	324	68.	L1.	59.	49.3	1.0	2.6	3.5	.008
	1115	324	61.	L1.	48.	50.8	1.0	2.9	3.5	.004
	1315	324	60.	L1.	49.	53.1	1.0	3.4	3.5	.005
	1515	324	66.	L1.	57.	53.7	1.0	3.7	3.5	.005
	1715	324	70.	L1.	58.	50.8	1.0	2.9	3.4	.007
	1915	324	69.	1.	56.	52.2	1.0	3.6	3.4	.071
	2115	324	76.	L1.	65.	53.3	1.0	3.3	3.4	.022
	2315	324	73.	L1.	56.	52.7	1.0	3.2	3.4	.005
78-09-20	0115	324	52.	L1.	43.	54.0	1.0	2.9	3.5	.069
	0315	324	77.	L1.	66.	54.7	1.0	2.9	3.5	.051
	0515	324	80.	L1.	69.	53.5	1.0	3.1	3.5	.029
	0715	324	82.	L1.	75.	53.5	1.0	3.0	3.5	.032
	0915	324	88.	L1.	57.	52.5	1.0	2.8	3.5	.175

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0001
COLUMBIA RIVER BELOW TRAIL, 1.8 KM NORTH OF WANETA POWER DAM, LAT. 49D 1M 39S LONG. 117D 36M 11S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	151022 PHOSPHORUS TOTAL DISSOLVED P MG/L	151023 PHOSPHORUS TOTAL DISSOLVED P MG/L	154061 PHOSPHORUS TOTAL P MG/L	154062 PHOSPHORUS TOTAL P MG/L	154063 PHOSPHORUS TOTAL P MG/L	16306L SULPHATE DISSOLVED SO4 MG/L	17206L CHLORIDE DISSOLVED CL MG/L	19103L POTASSIUM DISSOLVED K MG/L
78-09-19	0915	324	.008	.008	.015	.014	.016	8.6	.7	.6
	1115	324	.004	.005	.009	.010	.009	8.6	.6	.6
	1315	324	.005	.005	.009	.009	.009	8.7	.5	.6
	1515	324	.005	.005	.011	.011	.012	8.3	.6	.6
	1715	324	.007	.008	.013	.013	.013	8.4	.7	.6
	1915	324	.071	.073	.074	.079	.079	8.5	.6	.6
	2115	324	.021	.021	.028	.028	.028	8.5	.6	.6
	2315	324	.005	.005	.010	.010	.010	8.8	.7	.6
78-09-20	0115	324	.069	.072	.074	.075	.088	13.1	.7	.6
	0315	324	.050	.050	.054	.055	.054	11.5	.6	.6
	0515	324	.028	.028	.034	.034	.034	12.5	.7	.6
	0715	324	.032	.032	.038	.038	.038	12.5	.7	.6
	0915	324	.173	.173	.196	.196	.197	12.2	.6	.6

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	20101L CALCIUM DISSOLVED CA MG/L	250041 MANGANESE TOTAL MN MG/L	250042 MANGANESE TOTAL MN MG/L	250043 MANGANESE TOTAL MN MG/L	260051 IRON TOTAL FE MG/L	260052 IRON TOTAL FE MG/L	260053 IRON TOTAL FE MG/L	280021 NICKEL TOTAL NI MG/L
78-09-19	0915	324	15.5	.01	.01	.01	.037	.041	.041	.001
	1115	324	15.5	.01	.01	.01	.045	.038	.068	.001
	1315	324	15.7	.01	.01	.01	.048	.08 042	.08 043	.002
	1515	324	15.5	.01	.01	L.01	.08 041	.08 042	.08 043	.002
	1715	324	15.5	L.01	L.01	.01	.07 041	.07 042	.07 043	.002
	1915	324	15.0	L.01	L.01	L.01	.06 041	.12 042	.01 043	.001
	2115	324	15.9	.01	.01	.01	.09 041	.07 042	.06 043	.001
	2315	324	15.9	.01	.02	.01	.06 041	.11 042	.08 043	.002
78-09-20	0115	324	16.8	L.01	.01	.01	.08 041	.15 042	.07 043	L.001
	0315	324	17.1	.01	.01	.01	.10 041	.07 042	.06 043	L.001
	0515	324	16.4	.01	.01	.01	.18 041	.07 042	.08 043	.004
	0715	324	16.5	.01	.01	.01	.09 041	.07 042	.17 043	.002
	0915	324	16.4	.01	.02	.02	.08 041	.12 042	.13 043	L.001

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0001 LAT. 49D 1M 39S LONG. 117D 36M 11S
COLUMBIA RIVER BELOW TRAIL, 1.8 KM NORTH OF WANETA POWER DAM, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	280022 NICKEL TOTAL NI MG/L	280023 NICKEL TOTAL NI MG/L	290051 COPPER TOTAL CU MG/L	290052 COPPER TOTAL CU MG/L	290053 COPPER TOTAL CU MG/L	300041 ZINC TOTAL ZN MG/L	300042 ZINC TOTAL ZN MG/L	300043 ZINC TOTAL ZN MG/L
78-09-19	0915	324	.002	.001	.003	.003	.002	.05	.05	.05
	1115	324	L.001	L.001	.003	.003	.004	.05	.05	.05
	1315	324	.001	.002	.002	.003	.003	.05	.05	.05
	1515	324	.002	.001	.003	.005	.003	.05	.04	.04
	1715	324	.002	.002	.003	.005	.004	.04	.04	.04
	1915	324	.001	.001	.003	.003	.003	.03	.03	.03
	2115	324	.001	.001	.006	.003	.003	.03	.03	.03
	2315	324	.002	.002	.003	.002	.004	.03	.03	.04
78-09-20	0115	324	.001	L.001	.004	.004	.003	.04	.04	.03
	0315	324	L.001	.001	.004	.004	.004	.04	.03	.03
	0515	324	.005	.002	.004	.006	.003	.04	.04	.03
	0715	324	L.001	L.001	.004	.004	.004	.04	.04	.04
	0915	324	.001	L.001	.003	.005	.004	.04	.04	.04

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	480021 CADMIUM TOTAL CD MG/L	480022 CADMIUM TOTAL CD MG/L	480023 CADMIUM TOTAL CD MG/L	80311L MERCURY EXTRBLE. HG UG/L	820021 LEAD TOTAL PB MG/L	820022 LEAD TOTAL PB MG/L	820023 LEAD TOTAL PB MG/L
78-09-19	0915	324	L.0005	L.0005	L.0005	L.05	.004	.004	.004
	1115	324	L.0005	L.0005	L.0005	L.05	.004	.004	.005
	1315	324	L.0005	L.0005	L.0005	L.05	.008	.006	.004
	1515	324	L.0005	L.0005	L.0005	L.05	.003	.004	.003
	1715	324	L.0005	L.0005	L.0005	L.05	.005	.006	.005
	1915	324	L.0005	L.0005	L.0005	L.05	.003	.001	.004
	2115	324	L.0005	L.0005	L.0005	L.05	.005	.005	.005
	2315	324	L.0005	L.0005	L.0005	L.05	.006	.002	.003
78-09-20	0115	324	.0019	L.0005	L.0005	L.05	.007	.006	.006
	0315	324	L.0005	L.0005	L.0005	L.05	.006	.005	.005
	0515	324	L.0005	L.0005	L.0005	L.05	.006	.007	.005
	0715	324	.0009	L.0005	L.0005	L.05	.007	.007	.006
	0915	324	L.0005	L.0005	L.0005	L.05	.004	.005	.005

FOOTNOTE: L - LESS THAN DETECTION LIMIT G - GREATER THAN MEASUREMENT LIMIT
NOTEZ BIEN: L - PLUS PETIT QUE LA LIMITE DE DETECTION G - PLUS GRAND QUE LA LIMITE MESURE

Table 28a

Concentrations (mg/L) of nutrients and fluoride in samples collected at Birchbank, September 17 - September 20, 1979.

Station: Birchbank
Parameter: Nitrogen

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen
September 17	1100	.050	.008	.126
		.051	.008	.121
		.053	.017	.137
	1200	.055	.027	.128
		.051	.010	.116
		.051	.019	.122
	1300	.051	.015	.121
		.051	.017	.127
		.051	.019	.127
	1400	.051	.021	.166
		.051	.013	.121
		.050	.012	.121
	1500	.048	.013	.121
		.048	.016	.121
		.051	.027	.173
	1600	.048	.012	.126
		.050	.022	.160
		.048	.018	.137
	1700	.048	.023	.162
		.048	.015	.141
		.048	.010	.141
	1800	.046	.034	.168
		.047	.021	.177
		.046	.015	.126
	1900	.052	.155	.415
		.048	.018	.197
		.047	.007	.126
	2000	.053	.097	.366
		.049	.020	.157
		.048	.007	.151
	2100	.048	.005	.130
		.047	.007	.120
		.049	.033	.163
	2200	.048	.013	.131
		.048	.019	.172
		.049	.033	.193

Station: Birchbank
Parameter: Nitrogen (Cont'd)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen
September 17	2300	.051	.050	.265
		.048	.032	.180
		.051	.093	.339
	2400	.054	.020	.207
		.050	.052	.185
		.050	.030	.198
September 18	100	.049	.100	.245
		.048	.023	.137
		.048	.021	.177
	200	.048	.024	.137
		.051	.031	.188
		.049	.067	.241
	300	.047	.007	.121
		.049	.006	.121
		.048	.005	.121
	400	.051	.042	.229
		.049	.016	.137
		.052	.026	.162
	500	.051	.041	.204
		.053	.067	.222
		.051	.037	.168
	600	.050	.026	.163
		.055	.072	.232
		.049	.023	.127
	700	.045	.026	.147
		.046	.034	.163
		.047	.060	.208
	800	.045	.012	.121
		.047	.045	.209
		.044	.010	.116
	900	.045	.024	.132
		.047	.057	.211
		.046	.032	.163
	1000	.044	.008	.116
		.045	.011	.126
		.044	.014	.141

Station: Birchbank
Parameter: Nitrogen (Cont'd)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen
September 18	1100	.043	.010	.131
		.045	.022	.142
		.043	.011	.115
	1200	.043	.009	.111
		.043	.010	.116
		.043	.040	.144
	1300	.043	.010	.106
		.043	.008	.111
		.043	.009	.108
	1400	.045	.054	.265
		.043	.013	.126
		.043	.009	.111
	1500	.044	.010	.116
		.044	.008	.106
		.045	.011	.116
	1600	.044	.009	.116
		.047	.030	.348
		.046	.018	.134
	1700	.044	.015	.131
		.043	.010	.106
		.043	.011	.116
	1800	.044	.006	.121
		.044	.009	.111
		.044	.021	.132
	1900	.043	.009	.106
		.043	.010	.106
		.045	.030	.128
	2000	.043	.010	.106
		.043	.014	.126
		.043	.008	.101
	2100	.043	.017	.112
		.043	.013	.116
		.044	.018	.112
	2200	.042	.010	.096
		.042	.021	.107
		.042	.018	.117

Station: Birchbank
Parameter: Nitrogen (Cont'd)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen
September 18	2300	.042	.024	.097
		.042	.024	.102
		.042	.026	.113
	2400	.042	.022	.112
		.041	.026	.098
		.042	.024	.107
September 19	100	.042	.028	.113
		.042	.022	.102
		.042	.015	.097
	200	.044	.019	.102
		.044	.027	.118
		.044	.022	.117
	300	.044	.020	.102
		.044	.011	.096
		.044	.015	.102
	500	.046	.042	.134
		.047	.035	.129
		.043	.021	.122
	600	.044	.021	.107
		.045	.025	.113
		.043	.014	.101
	700	.044	.018	.107
		.044	.016	.102
		.044	.016	.107
	800	.045	.020	.107
		.045	.031	.118
		.044	.017	.107
	900	.045	.026	.117
		.045	.013	.101
		.045	.030	.118
	1000	.047	.031	.138
		.045	.031	.128
		.048	.092	.214
	1100	.047	.012	.106
		.046	.014	.106
		.048	.026	.122

Station: Birchbank
Parameter: Nitrogen (Cont'd)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen
September 19	1200	.047	.020	.112
		.047	.031	.156
		.047	.028	.123
	1300	.046	.021	.107
		.046	.018	.107
		.047	.020	.112
	1400	.047	.029	.113
		.048	.021	.107
		.047	.026	.108
	1500	.047	.037	.124
		.047	.025	.127
		.048	.033	.128
	1600	.047	.022	.132
		.047	.013	.116
		.047	.015	.121
	1700	.051	.037	.164
		.047	.023	.132
		.049	.044	.214
	1800	.046	.021	.127
		.046	.074	.132
		.046	.048	.138
	1900	.049	.016	.121
		.048	.012	.114
		.048	.014	.111
	2000	.048	.020	.112
		.048	.025	.117
		.047	.016	.121
	2100	.047	.015	.121
		.046	.133	.330
		.047	.034	.158
	2200	.048	.028	.152
		.047	.021	.122
		.047	.019	.122
	2300	.043	.019	.107
		.045	.014	.108
		.046	.028	.122

Station: Birchbank
Parameter: Nitrogen (Cont'd)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen
September 19	2400	.044	.013	.101
		.046	.025	.107
		.045	.012	.096
September 20	100	.045	.014	.096
		.045	.012	.101
		.045	.016	.111
	200	.046	.013	.106
		.045	.016	.101
		.045	.028	.113
	300	.045	.012	.101
		.045	.013	.101
		.046	.032	.113
	400	.046	.012	.101
		.046	.018	.107
		.047	.054	.140
	500	.046	.022	.107
		.046	.024	.102
		.046	.030	.113
	600	.045	.010	.101
		.045	.035	.118
		.046	.011	.101
	700	.045	.012	.106
		.046	.033	.133
		.047	.012	.106
	800	.045	.012	.101
		.046	.011	.106
		.045	.015	.106
	900	.045	.004	.100
		.046	.017	.107
		.045	.005	.110
	1000	.046	.002	.125
		.046	.010	.106
		.046	.013	.106

Station: Birchbank
Parameter: Phosphorus

Date	Time	Total	Dissolved	Diss/Total Ratio
September 17	1100	.007	.004	
		.012	.002	.37
		.008	.004	
	1200	.006		
		.007		
		.007		
	1300	.006		
		.006		
		.006		
	1400	.008		
		.007		
		.006		
	1500	.006		
		.006		
		.006		
	1600	.006		
		.007		
		.007		
	1700	.007	<.002	
		.007	<.002	*
		.007	<.002	
	1800	.008		
		.006		
		.006		
	1900	.012		
		.006		
		.006		
	2000	.006		
		.007		
		.007		
	2100	.007		
		.009		
		.007		
	2200	.007		
		.012		
		.007		

Station: Birchbank
Parameter: Phosphorus (Cont'd)

Date	Time	Total	Dissolved	Diss/Total Ratio
September 17	2300	.013	.003	
		.025	.002	.15
		.008	.002	
	2400	.007		
		.008		
		.008		
September 18	100	.006		
		.006		
		.006		
	200	.007		
		.006		
		.006		
	300	.006		
		.006		
		.005		
	400	.006		
		.006		
		.007		
	500	.006	.002	
		.006	.002	.35
		.005	.002	
	600	.006		
		.006		
		.006		
	700	.008		
		.006		
		.007		
	800	.007		
		.011		
		.006		
	900	.006		
		.008		
		.006		
	1000	.006		
		.006		
		.010		

Station: Birchbank
Parameter: Phosphorus (Cont'd)

Date	Time	Total	Dissolved	Diss/Total Ratio
September 18	1100	.006	<.002	
		.006	<.002	*
		.006	<.002	
	1200	.007		
		.006		
		.006		
	1300	.006		
		.006		
		.006		
	1400	.006		
		.007		
		.006		
	1500	.006		
		.006		
		.006		
	1600	.006		
		.006		
		.011		
	1700	.007	<.002	
		.006	<.002	*
		.006	<.002	
	1800	.006		
		.008		
		.006		
	1900	.009		
		.008		
		.007		
	2000	.009		
		.006		
		.006		
	2100	.006		
		.006		
		.008		
	2200	.006		
		.010		
		.006		

Station: Birchbank
Parameter: Phosphorus (Cont'd)

Date	Time	Total	Dissolved	Diss/Total Ratio
September 18	2300	.006	.002	
		.010	<.002	*
		.006	<.002	
	2400	.006		
		.007		
		.006		
September 19	100	.006		
		.007		
		.006		
	200	.006		
		.006		
		.007		
	300	.007		
		.007		
		.007		
	500	.006	<.002	
		.015	<.002	*
		.006	<.002	
	600	.006		
		.006		
		.007		
	700	.006		
		.006		
		.006		
	800	.006		
		.006		
		.006		
	900	.006		
		.006		
		.006		
	1000	.008		
		.007		
		.015		
	1100	.006	<.002	
		.006	<.002	*
		.006	<.002	

Station: Birchbank
Parameter: Phosphorus (Cont'd)

Date	Time	Total	Dissolved	Diss/Total Ratio
September 19	1200	.005		
		.007		
		.006		
	1300	.004		
		.005		
		.007		
	1400	.006		
		.004		
		.005		
	1500	.006		
		.006		
		.007		
	1600	.006		
		.005		
		.006		
	1700	.005	<.002	
		.006	.002	*
		.007	<.002	
	1800	.008		
		.005		
		.005		
	1900	.009		
		.006		
		.005		
	2000	.005		
		.007		
		.011		
	2100	.007		
		.005		
		.005		
	2200	.004		
		.006		
		.005		
	2300	.005	<.002	
		.005	.002	*
		.005	<.002	

Station: Birchbank
Parameter: Phosphorus (Cont'd)

Date	Time	Total	Dissolved	Diss/Total Ratio
September 19	2400	.009		
		.006		
		.006		
September 20	100	.005		
		.006		
		.006		
	200	.007		
		.006		
		.009		
	300	.006		
		.010		
		.006		
	400	.013		
		.005		
		.005		
	500	.005	<.002	
		.012	<.002	*
		.036	<.002	
	600	.004		
		.005		
		.035		
	700	.008		
		.004		
		.004		
	800	.004		
		.006		
		.007		
	900	.006		
		.004		
		.005		
	1000	.004		
		.005		
		.004		

Station: Birchbank
Parameter: Fluoride

Date	Time		Replicates	
September 17	1100	.081	.078	.074
	1200	.074		
	1300	.074		
	1400	.075		
	1500	.074		
	1600	.073		
	1700	.074	.073	.073
	1800	.072		
	1900	.072		
	2000	.072		
	2100	.071		
	2200	.071		
	2300	.070	.070	.070
	2400	.069		
September 18	100	.070		
	200	.070		
	300	.072		
	400	.072		
	500	.072	.072	.071
	600	.070		
	700	.071		
	800	.070		
	900	.069		
	1000	.065		
	1100	.068	.070	.071
	1200	.068		
	1300	.070		
	1400	.068		
	1500	.070		
	1600	.064		
	1700	.065	.068	.064
	1800	.068		
	1900	.069		
	2000	.068		
	2100	.070		
	2200	.070		
	2300	.067	.070	.070
	2400	.070		
September 19	100	.071		
	200	.069		
	300	.067		
	500	.068	.070	.069
	600	.066		
	700	.069		
	800	.070		
	900	.068		

Station: Birchbank
Parameter: Fluoride (Cont'd)

Date	Time		Replicates	
September 19	1000	.066		
	1100	.067	.067	.067
	1200	.067		
	1300	.070		
	1400	.070		
	1500	.068		
	1600	.073		
	1700	.073	.073	.072
	1800	.073		
	1900	.074		
	2000	.075		
	2100	.076		
	2200	.076		
	2300	.075	.075	.075
	2400	.075		
September 20	100	.077		
	200	.077		
	300	.074		
	400	.075		
	500	.076	.076	.075
	600	.075		
	700	.075		
	800	.075		
	900	.072		
	1000	.073		

Table 28b

Concentrations (mg/L) of nutrients and other parameters in samples collected at Waneta, September 17 - September 20, 1979.

Station: Waneta
Parameter: Nitrogen (ISCO Automatic Sampler, Unfiltered)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen
September 17	1100	.062	.048	.155
	1130	.068	.057	.166
	1230	.063	.048	.170
	1330	.063	.062	.161
	1430	.061	.050	.155
	1530	.062	.048	.165
	1630	.061	.049	.150
	1730	.062	.058	.156
	1830	.060	.052	.155
	1930	.061	.047	.150
	2030	.058	.043	.149
	2130	.060	.041	.164
	2230	.058	.060	.154
	2330	.059	.108	.171
September 18	030	.060	.138	.199
	130	.061	.147	.225
	230	.062	.138	.224
	330	.062	.154	.235
	430	.062	.114	.201
	530	.062	.073	.182
	630	.060	.058	.151
	730	.061	.046	.160
	830	.059	.048	.150
	930	.057	.045	.139
	1030	.056	.056	.136
	1130	.055	.046	.140
	1230	.054	.034	.133
	1330	.054	.033	.143
	1430	.052	.030	.133
	1530	.053	.029	.133
	1630	.052	.029	.138
	1730	.051	.028	.138
	1830	.051	.030	.138
	1930	.051	.038	.139
	2030	.052	.040	.134
	2130	.052	.052	.135
	2230	.052	.037	.128
	2330	.050	.038	.134
September 19	030	.050	.039	.134
	130	.051	.047	.130
	230	.052	.046	.130
	330	.051	.048	.135
	430	.051	.047	.135
	530	.052	.048	.135
	630	.052	.049	.135
	730	.055	.094	.159
	830	.055	.087	.159
	930	.052	.052	.145
	1030	.053	.050	.158

Station: Waneta
Parameter: Nitrogen (ISCO Automatic Sampler, Unfiltered)
(Cont'd)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen
September 19	1130	.052	.049	.145
	1230	.053	.049	.145
	1330	.053	.067	.152
	1430	.053	.050	.145
	1530	.052	.038	.149
	1630	.052	.034	.136
	1730	.055	.236	.383
	1830	.058	.148	.225
	1930	.055	.071	.152
	2030	.054	.067	.152
	2130	.054	.052	.140
	2230	.054	.052	.135
	2330	.059	.051	.140
September 20	030	.054	.047	.135
	130	.054	.046	.135
	230	.054	.044	.129
	330	.054	.045	.129
	430	.054	.049	.130
	530	.054	.049	.130
	630	.055	.050	.135
	730	.055	.045	.129
	830	.060	.042	.134
	930	.052	.041	.129

Station: Waneta
Parameter: Nitrogen (Quality Control, Filtered)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen	Particulate Nitrogen
September 17	1100	.063	.059	.126	.043
		.062	.059	.126	.047
		.062	.061	.141	.042
	1530	.060	.049	.142	.038
		.061	.063	.126	.041
		.060	.059	.126	.037
	2030	.058	.049	.120	.039
		.058	.048	.120	.042
		.057	.047	.120	.041
September 18	930	.056	.046	.120	.040
		.056	.048	.120	.039
		.056	.045	.120	.042
	1330	.054	.036	.136	.041
		.054	.034	.123	.043
		.054	.034	.118	.042
	1530	.052	.037	.142	.037
		.052	.037	.114	.038
		.052	.034	.114	.040
	1930	.051	.040	.134	.038
		.052	.041	.134	.040
		.052	.042	.134	.042
September 19	930	.054	.054	.125	.040
		.054	.055	.130	.033
		.054	.054	.130	.038
	1230	.050	.048	.105	.039
		.052	.047	.120	.040
		.050	.046	.115	.039
	1630	.052	.042	.114	.132
		.052	.043	.119	.147
		.052	.054	.114	.108
	1930	.054	.076	.187	.144
		.054	.079	.138	.113
		.054	.078	.154	.060

Station: Waneta
Parameter: Nitrogen (Quality Control, Filtered) (Cont'd)

Date	Time	Nitrate + Nitrite	Ammonia	Total Nitrogen	Particulate Nitrogen
September 20	930	.053	.044	.119	.087
		.052	.047	.120	.080
		.052	.045	.114	.069
	Blanks	<.002	.006	<.01	
		<.002	.005	<.01	
	*	<.002	.004	<.01	

* This "replicate" is an unfiltered blank.

Station: Waneta
Parameter: Phosphorus

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
September 17	1100	.117	.130	.106	
			.128	.108	.83
			.130	.108	
	1200	.186			
	1300	.118			
	1400	.064			
	1500	.054	.043	.035	
			.049	.035	.77
			.043	.034	
	1600	.047			
	1700	.059			
	1800	.060			
	1900	.066			
	2000	.047	.045	.035	
			.044	.036	.79
			.044	.034	
	2100	.048			
	2200	.053			
	2300	.060	.046		
			.045		
			.045		
	2400	.051			
September 18	100	.064			
	200	.071			
	300	.071			
	400	.077			
	500	.078			
	600	.108			
	700	.086			
	800	.096	.093		
			.094		
			.092		
	900	.121			
	1000	.094	.089	.079	
			.089	.079	.65
			.189	.079	
	1100	.099			
	1200	.062			
	1300	.075	.048	.028	
			.048	.028	.57
			.047	.026	
	1400	.047			
	1500	.054	.040	.032	
			.040	.031	.78
			.040	.031	
	1600	.042			
	1700	.033			

Station: Waneta
Parameter: Phosphorus (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
September 18	1800	.028			
	1900		.039	.028	
			.037	.028	.74
			.037	.028	
	2000	.038			
	2100	.097			
	2200	.044	.030		
			.028		
			.029		
	2300	.098			
	2400	.087			
September 19	100	.061			
	200	.089			
	300	.092			
	400	.079			
	500	.063			
	600	.067			
	700	.051			
	800	.043	.041		
			.041		
			.041		
	900	.047			
	1000	.057	.044	.034	
			.044	.034	.76
			.044	.032	
	1100	.077			
	1200	.072			
	1300	.095	.055	.041	
			.051	.042	.78
			.052	.041	
	1400	.059	.047		
			.047		
			.046		
	1500	.062	.047		
			.047		
			.047		
	1600	.056	.046	.037	
			.046	.037	.80
			.046	.036	
	1700	.056	.051		
			.050		
			.051		

Station: Waneta
Parameter: Phosphorus (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
September 19	1800	.069			
	1900	.115	.121	.109	
			.123	.101	.86
			.117	.100	
	2000	.131	.116		
			.117		
			.116		
	2100	.102			
	2200	.108			
	2300		.227		
			.227		
			.228		
	2400	.134	.123		
			.118		
			.119		
September 20	100	.135			
	200	.119			
	300	.089			
	400	.072			
	500	.068			
	600	.082			
	700	.060			
	800	.049			
	900	.158	.028	.018	
			.028	.018	.65
			.029	.019	
	1000		.184		
			.183		
			.185		
	Blanks		<.002		
			<.002		
			<.002		

Station: Waneta
Parameter: Particulate Carbon

Date	Time	Concentration
September 17	1100	.363
		.395
		.361
	1530	.336
		.353
		.310
	2030	.331
		.345
		.355
September 18	930	.345
		.334
		.330
	1330	.342
		.342
		.345
	1530	.309
		.310
		.316
	1930	.321
		.325
		.342
September 19	930	.310
		.284
		.318
	1230	.322
		.330
		.336
	1630	.405
		.431
		.387
	1930	.420
		.373
		.382
September 20	930	.361
		.332
		.317

Station: Waneta
Parameter: Fluoride

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
September 17	1100	.166	.190	.185	.185
	1130	.200			
	1230	.175			
	1330	.152			
	1430	.141			
	1530	.140	.145	.140	.135
	1630	.148			
	1730	.141			
	1830	.134			
	1930	.130			
	2030	.139	.130	.130	.135
	2130	.141			
	2230	.149			
	2330	.161			
September 18	030	.159			
	130	.164			
	230	.162			
	330	.162			
	430	.161			
	530	.161			
	630	.166			
	730	.170			
	830	.172			
	930	.161	.160	.160	.160
	1030	.152			
	1130	.132			
	1230	.125			
	1330	.112	.120	.110	.110
	1430	.105			
	1530	.102	.100	.098	.097
	1630	.102			
	1730	.102			
	1830	.100			
	1930	.097	.090	.090	.088
	2030	.094			
	2130	.092			
	2230	.106			
	2330	.129			
September 19	030	.120			
	130	.132			
	230	.140			
	330	.149			
	430	.149			
	530	.152			
	630	.151			
	730	.148			
	830	.138			
	930	.137	.112	.120	.125
	1030	.138			

Station: Waneta
Parameter: Fluoride (Cont'd)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
September 19	1130	.158			
	1230	.156	.155	.190	.180
	1330	.158			
	1430	.150			
	1530	.146			
	1630	.150	.160	.155	.150
	1730	.158			
	1830	.152			
	1930	.161	.165	.165	.170
	2030	.136			
	2130	.141			
	2230	.172			
	2330	.159			
September 20	030	.150			
	130	.150			
	230	.135			
	330	.140			
	430	.135			
	530	.138			
	630	.138			
	730	.138			
	830	.105			
	930	.115	.130	.125	.125

Table 29

Concentrations (mg/L) of nutrients and fluoride measured at five points on the cross section at Birchbank on September 18, 1979.

	Meters from Left Bank				
Parameter	30	60	90	120	150
Total Phosphorus	.006	.013	.007	.006	.007
	.006	.009	.007	.008	.007
	.006	.007	.007	.006	.007
Mean	.006	.010	.007	.007	.007
S. D.	0	.003	0	.001	0
Nitrate + Nitrite	.046	.045	.046	.045	.045
	.045	.045	.045	.045	.045
	.044	.045	.045	.045	.046
Mean	.045	.045	.045	.045	.045
S. D.	.001	0	.001	0	.001
Ammonia	.044	.017	.025	.014	.030
	.010	.018	.011	.012	.014
	.011	.018	.013	.012	.040
Mean	.022	.018	.016	.013	.028
S. D.	.019	.001	.008	.001	.013
Total Nitrogen	.139	.117	.133	.106	.108
	.106	.112	.106	.106	.106
	.101	.112	.106	.111	.126
Mean	.115	.114	.115	.108	.113
S. D.	.021	.003	.016	.003	.011
Fluoride	.144	.087	.081	.078	.077

Table 30a

Concentrations (mg/L) of metals in samples collected at Birchbank, May 12 - May 15, 1981.

Station: Birchbank
Metal: Total Cd

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 12	900	.0024	<.0005	<.0005	.0005
	1000	.0011	<.0005	<.0005	<.0005
	1100	.0007	<.0005	<.0005	<.0005
	1200	.0011	<.0005	<.0005	<.0005
	1300	<.0005	<.0005	<.0005	<.0005
	1400	<.0005	<.0005	<.0005	<.0005
	1500	.0013	<.0005	<.0005	<.0005
	1600	.0008	<.0005	<.0005	<.0005
	1700	.0008			
	1800	.0006			
	1900	<.0005			
	2000	<.0005			
	2100	<.0005			
	2200	<.0005			
	2300	<.0005			
	2400	<.0005			
May 13	100	.0006			
	200	<.0005			
	300	<.0005			
	400	.0008			
	500	<.0005			
	600	<.0005			
	700	<.0005			
	900	<.0005	<.0005	<.0005	<.0005
	1000	.0005	<.0005	<.0005	<.0005
	1100	.0005	<.0005	<.0005	<.0005
	1200	.0008	<.0005	<.0005	<.0005
	1300	<.0005	<.0005	<.0005	<.0005
	1400	<.0005	<.0005	<.0005	<.0005
	1500	<.0005	<.0005	<.0005	<.0005
	1600	<.0005	<.0005	<.0005	<.0005
	1700	<.0005			
	1800	<.0005			
	1900	<.0005			
	2000	<.0005			
	2100	<.0005	<.0005	<.0005	<.0005
	2200	.0006			
	2300	<.0005			
	2400	<.0005			
May 14	100	<.0005			
	200	<.0005			
	300	<.0005			
	400	<.0005			
	500	<.0005			
	600	<.0005			
	700	<.0005			

Station: Birchbank
Metal: Total Cd (Cont'd)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 14	800	<.0005			
	900	<.0005	<.0005	<.0005	<.0005
	1000	<.0005	<.0005	.0012	<.0005
	1100	<.0005	<.0005	<.0005	<.0005
	1200	<.0005	<.0005	<.0005	<.0005
	1300	<.0005	<.0005	<.0005	<.0005
	1400	<.0005	<.0005	<.0005	<.0005
	1500	<.0005	<.0005	<.0005	<.0005
	1600	.0005	<.0005	<.0005	<.0005
	1700	<.0005			
	1800	<.0005			
	1900	<.0005			
	2000	<.0005	<.0005	<.0005	<.0005
	2100	<.0005			
	2200	<.0005			
	2300	<.0005			
	2400	<.0005			
May 15	100	<.0005			
	200	<.0005			
	300	<.0005			
	400	<.0005			
	500	<.0005			
	600	<.0005			
	700	<.0005			
	800	<.0005			
	900	<.0005	<.0005	<.0005	<.0005

Station: Birchbank
Metal: Total Cu

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 12	900	.002	.001	<.001	<.001
	1000	.001	<.001	.001	<.001
	1100	.001	<.001	<.001	<.001
	1200	.001	<.001	<.001	.001
	1300	.001	<.001	<.001	<.001
	1400	.002	<.001	<.001	<.001
	1500	.001	<.001	<.001	<.001
	1600	<.001	<.001	<.001	<.001
	1700	<.001			
	1800	.001			
	1900	.001			
	2000	<.001			
	2100	<.001			
	2200	.002			
	2300	.001			
	2400	<.001			
May 13	100	.002			
	200	.002			
	300	<.001			
	400	<.001			
	500	<.001			
	600	.003			
	700	<.001			
	900	.002	.002	<.001	<.001
	1000	.001	<.001	<.001	<.001
	1100	.002	.001	<.001	<.001
	1200	<.001	<.001	.001	.001
	1300	<.001	<.001	<.001	.002
	1400	<.001	<.001	<.001	<.001
	1500	.001	<.001	<.001	<.001
	1600	<.001	.006	<.001	<.001
	1700	<.001			
	1800	<.001			
	1900	<.001			
	2000	<.001			
	2100	.002	<.001	<.001	<.001
	2200	.005			
	2300	.002			
	2400	<.001			
May 14	100	<.001			
	200	<.001			
	300	.002			
	400	<.001			
	500	.002			
	600	.001			
	700	<.001			

Station: Birchbank
Metal: Total Cu (Cont'd)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 14	800	.001			
	900	.001	<.001	.001	.003
	1000	<.001	<.001	.001	<.001
	1100	.001	<.001	<.001	<.001
	1200	.001	<.001	<.001	.002
	1300	<.001	.001	.002	<.001
	1400	<.001	<.001	.001	.002
	1500	<.001	<.001	<.001	.001
	1600	<.001	<.001	<.001	<.001
	1700	<.001			
	1800	<.001			
	1900	.002			
	2000	<.001	<.001	<.001	.001
	2100	<.001			
	2200	<.001			
	2300	<.001			
	2400	<.001			
May 15	100	<.001			
	200	<.001			
	300	<.001			
	400	<.001			
	500	<.001			
	600	<.001			
	700	<.001			
	800	<.001			
	900	<.001	<.001	<.001	<.001

Station: Birchbank
Metal: Total Pb

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 12	900	<.001	.001	.001	.002
	1000	<.001	.004	<.001	.002
	1100	.001	<.001	.002	.003
	1200	.004	.001	.003	<.001
	1300	.001	.002	.002	.004
	1400	.002	<.001	<.001	<.001
	1500	<.001	<.001	<.001	<.001
	1600	<.001	<.001	<.001	<.001
	1700	<.001			
	1800	<.001			
	1900	.001			
	2000	<.001			
	2100	<.001			
	2200	<.001			
	2300	<.001			
	2400	<.001			
May 13	100	.002			
	200	.001			
	300	.001			
	400	.001			
	500	<.001			
	600	<.001			
	700	<.001			
	900	<.001	<.001	<.001	<.001
	1000	<.001	<.001	<.001	<.001
	1100	<.001	<.001	<.001	<.001
	1200	<.001	<.001	.003	<.001
	1300	<.001	.001	<.001	<.001
	1400	.001	<.001	<.001	.001
	1500	.001	<.001	<.001	<.001
	1600	<.001	<.001	<.001	<.001
	1700	.002			
	1800	<.001			
	1900	<.001			
	2000	.001			
	2100	<.001	<.001	.001	<.001
	2200	<.001			
	2300	.001			
	2400	<.001			
May 14	100	<.001			
	200	<.001			
	300	<.001			
	400	<.001			
	500	.002			
	600	.001			
	700	.001			

Station: Birchbank
Metal: Total Pb (Cont'd)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 14	800	<.001			
	900	<.001	<.001	<.001	.001
	1000	<.001	<.001	.010	.001
	1100	<.001	.004	<.001	<.001
	1200	.005	.002	.002	.002
	1300	.002	.004	.001	.001
	1400	.002	.002	.004	.006
	1500	.004	.001	.001	.005
	1600	<.001	.002	.001	.005
	1700	<.001			
	1800	.002			
	1900	<.001			
	2000	.001	<.001	.001	.002
	2100	.001			
	2200	<.001			
	2300	.001			
	2400	<.001			
May 15	100	<.001			
	200	<.001			
	300	.001			
	400	.001			
	500	<.001			
	600	<.001			
	700	<.001			
	800	<.001			
	900	<.001	<.001	<.001	<.001

Station: Birchbank
Metal: Total Zn

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 12	900	.002	.002	<.001	.003
	1000	.003	.002	<.001	<.001
	1100	.001	.002	.001	.003
	1200	.002	.001	.002	.002
	1300	.002	.001	<.001	.002
	1400	.001	<.001	<.001	<.001
	1500	<.001	.001	<.001	<.001
	1600	<.001	<.001	<.001	<.001
	1700	<.001			
	1800	.003			
	1900	.003			
	2000	.003			
	2100	.002			
	2200	.004			
	2300	.003			
	2400	.001			
May 13	100	.003			
	200	.004			
	300	.003			
	400	.005			
	500	.002			
	600	.004			
	700	.002			
	900	.003	.003	.002	.003
	1000	.003	.003	.002	.002
	1100	.004	.001	.002	.007
	1200	.003	.001	.005	.002
	1300	.004	.001	.002	.001
	1400	.003	.002	.001	.001
	1500	.001	.001	.002	.001
	1600	.003	.003	<.001	<.001
	1700	.002			
	1800	.002			
	1900	.002			
	2000	.003			
	2100	.003	.001	.002	.001
	2200	.004			
	2300	.002			
	2400	.003			
May 14	100	.002			
	200	.005			
	300	.003			
	400	.003			
	500	<.001			
	600	.007			
	700	<.001			

Station: Birchbank
Metal: Total Zn (Cont'd)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 14	800	.002			
	900	.002	.006	.004	.002
	1000	.001	.002	.002	<.001
	1100	.004	<.001	<.001	<.001
	1200	.005	.002	<.001	<.001
	1300	.004	<.001	.001	.001
	1400	.001	.004	.002	.003
	1500	.001	.001	<.001	.001
	1600	.003	<.001	<.001	.002
	1700	.001			
	1800	.003			
	1900	.001			
	2000	.002	.001	.002	.002
	2100	.002			
	2200	.003			
	2300	.002			
	2400	.002			
May 15	100	<.001			
	200	.001			
	300	.003			
	400	.002			
	500	.002			
	600	<.001			
	700	<.001			
	800	.002			
	900	.001	.002	<.001	.001

Station: Birchbank
Metal: Extractable As

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 12	900	.0003	.0003	.0003	.0002
	1000	.0003	.0003	.0003	.0003
	1100	.0003	.0003	.0003	.0003
	1200	.0003	.0003	.0003	.0003
	1300	.0003	.0003	.0003	.0003
	1400	.0003	.0003	.0002	.0003
	1500	.0003	.0003	.0003	.0003
	1600	.0003	.0003	.0003	.0004
	1700	.0003			
	1800	.0003			
	1900	.0002			
	2000	.0003			
	2100	.0003			
	2200	.0003			
	2300	.0003			
	2400	.0003			
May 13	100	.0003			
	200	.0003			
	300	.0003			
	400	.0003			
	600	.0003			
	700	.0003			
	900	.0003	.0003	.0003	.0003
	1000	.0003	.0003	.0003	.0004
	1100	.0003	.0003	.0003	.0003
	1200	.0003	.0004	.0003	.0003
	1300	.0003	.0003	.0003	.0003
	1400	.0003	.0003	.0003	.0003
	1500	.0003	.0003	.0003	.0003
	1600	.0003	.0003	.0003	.0002
	1700	.0003			
	1800	.0003			
	1900	.0003			
	2000	.0001			
	2100	.0003	.0002	.0003	.0003
	2200	.0003			
	2300	.0003			
	2400	.0003			
May 14	100	.0003			
	200	.0003			
	300	.0003			
	400	.0003			
	500	.0003			
	600	.0003			
	700	.0003			

Station: Birchbank
Metal: Extractable As (Cont'd)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 14	800	.0003			
	900	.0003	.0003	.0003	.0003
	1000	.0003	.0003	.0003	.0003
	1100	.0003	.0003	.0003	.0003
	1200	.0003	.0002	.0003	.0003
	1300	.0003	.0003	.0003	.0003
	1400	.0003	.0003	.0003	.0003
	1500	.0003	.0003	.0002	.0003
	1600	.0002	.0003	.0003	.0003
	1700	.0003			
	1800	.0003			
	1900	.0003			
	2000	.0003	.0003	.0003	.0003
	2100	.0003			
	2200	.0003			
	2300	.0003			
	2400	.0003			
May 15	100	.0003			
	200	.0003			
	300	.0003			
	400	.0003			
	500	.0003			
	600	.0003			
	700	.0003			
	800	.0003			
	900	.0003	.0003	.0003	.0002

Station: Birchbank
Metal: Extractable Hg (ug/L)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 12	900	<.05	<.05	<.05	<.05
	1000	<.05	<.05	<.05	<.05
	1100	<.05	<.05	<.05	<.05
	1200	<.05	<.05	<.05	<.05
	1300	<.05	<.05	<.05	<.05
	1400	<.05	<.05	<.05	<.05
	1500	<.05	<.05	<.05	<.05
	1600	<.05	<.05	<.05	<.05
	1700	<.05			
	1800	<.05			
	1900	<.05			
	2000	<.05			
	2100	<.05			
	2200	<.05			
	2300	<.05			
	2400	<.05			
May 13	100	<.05			
	200	<.05			
	300	<.05			
	400	<.05			
	600	<.05			
	700	<.05			
	900	<.05	<.05	<.05	<.05
	1000	<.05	<.05	<.05	<.05
	1100	<.05	<.05	<.05	<.05
	1200	<.05	<.05	<.05	<.05
	1300	<.05	<.05	<.05	<.05
	1400	<.05	<.05	<.05	<.05
	1500	<.05	<.05	<.05	<.05
	1600	<.05	<.05	<.05	<.05
	1700	<.05			
	1800	<.05			
	1900	<.05			
	2000	<.05			
	2100	<.05	<.05	<.05	<.05
	2200	<.05			
	2300	<.05			
	2400	<.05			
May 14	100	<.05			
	200	<.05			
	300	<.05			
	400	<.05			
	500	<.05			
	600	<.05			
	700	<.05			

Station: Birchbank
Metal: Extractable Hg (Cont'd)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 14	800	<.05			
	900	<.05	<.05	<.05	<.05
	1000	<.05	<.05	<.05	<.05
	1100	<.05	<.05	<.05	<.05
	1200	<.05	<.05	<.05	<.05
	1300	<.05	<.05	<.05	<.05
	1400	<.05	<.05	<.05	<.05
	1500	<.05	<.05	<.05	<.05
	1600	<.05	<.05	<.05	<.05
	1700	<.05			
	1800	<.05			
	1900	<.05			
	2000	<.05	<.05	<.05	<.05
	2100	<.05			
	2200	.17			
	2300	<.05			
	2400	<.05			
May 15	100	<.05			
	200	<.05			
	300	<.05			
	400	<.05			
	500	<.05			
	600	<.05			
	700	<.05			
	800	<.05			
	900	<.05	<.05	<.05	<.05

Station: Birchbank
Metal: Extractable Se

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 12	900	<.0001	<.0001	<.0001	<.0001
	1000	<.0001	<.0001	.0001	<.0001
	1100	<.0001	<.0001	<.0001	<.0001
	1200	<.0001	<.0001	<.0001	<.0001
	1300	<.0001	<.0001	<.0001	<.0001
	1400	<.0001	<.0001	<.0001	<.0001
	1500	<.0001	<.0001	<.0001	<.0001
	1600	<.0001	<.0001	<.0001	<.0001
	1700	<.0001			
	1800	<.0001			
	1900	<.0001			
	2000	<.0001			
	2100	<.0001			
	2200	<.0001			
	2300	<.0001			
	2400	<.0001			
May 13	100	<.0001			
	200	<.0001			
	300	<.0001			
	400	<.0001			
	600	<.0001			
	700	<.0001			
	900	<.0001	<.0001	<.0001	<.0001
	1000	<.0001	<.0001	<.0001	<.0001
	1100	<.0001	<.0001	<.0001	<.0001
	1200	<.0001	<.0001	<.0001	<.0001
	1300	<.0001	<.0001	<.0001	<.0001
	1400	<.0001	<.0001	<.0001	<.0001
	1500	<.0001	<.0001	<.0001	<.0001
	1600	<.0001	<.0001	<.0001	<.0001
	1700	<.0001			
	1800	<.0001			
	1900	<.0001			
	2000	<.0001			
	2100	<.0001	<.0001	<.0001	<.0001
	2200	<.0001			
	2300	<.0001			
	2400	<.0001			
May 14	100	<.0001			
	200	<.0001			
	300	<.0001			
	400	<.0001			
	500	<.0001			
	600	<.0001			
	700	<.0001			

Station: Birchbank
Metal: Extractable Se (Cont'd)

Date	Time	Auto. Sampler (ISCO)	Quality Control (Replicates)		
May 14	800	<.0001			
	900	<.0001	<.0001	<.0001	<.0001
	1000	<.0001	<.0001	<.0001	<.0001
	1100	<.0001	<.0001	<.0001	<.0001
	1200	<.0001	<.0001	<.0001	<.0001
	1300	<.0001	<.0001	<.0001	<.0001
	1400	<.0001	<.0001	<.0001	<.0001
	1500	<.0001	<.0001	<.0001	<.0001
	1600	<.0001	<.0001	<.0001	<.0001
	1700	<.0001			
	1800	<.0001			
	1900	<.0001			
	2000	<.0001	<.0001	<.0001	<.0001
	2100	<.0001			
	2200	<.0001			
	2300	<.0001			
	2400	<.0001			
May 15	100	<.0001			
	200	<.0001			
	300	<.0001			
	400	<.0001			
	500	<.0001			
	600	<.0001			
	700	<.0001			
	800	<.0001			
	900	<.0001	<.0001	<.0001	<.0001

Table 30b

Concentrations (mg/L) of metals in samples collected at Waneta, May 12 - May 15, 1981.

Station: Waneta
Metal: Total Cd

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 12	922		.0009	.0012	.0013
	1001	.0008			
	1100	<.0005	.0007	<.0005	.0007
	1200	<.0005	.0005	.0006	<.0005
	1300	<.0005	.0005	.0006	<.0005
	1400	<.0005	.0009	.0005	<.0005
	1500	<.0005	.0006	.0007	<.0005
	1600	<.0005	<.0005	<.0005	<.0005
	1700	<.0005	<.0005	<.0005	<.0005
	1800	<.0005			
	1900	<.0005			
	2000	<.0005			
	2100	.0005			
	2200	.0006			
	2300	<.0005			
	2400	.0007			
May 13	100	.0005			
	200	.0007			
	300	.0007			
	400	.0009			
	500	.0007			
	600	.0005			
	700	<.0005			
	800	.0005			
	900	.0005			
	1000	.0005	.0007	.0005	<.0005
	1100	.0005			
	1200		.0008	.0008	.0005
	1225	<.0005			
	1300		.0006	<.0005	.0007
	1400	.0007	<.0005	.0007	.0005
	1500	.0007	<.0005	.0006	.0006
	1600		.0005		
	1700	.0007			
	1800	.0007			
	2100	.0007	.0006	.0005	.0005
	2200		.0006	.0008	.0007
	2325	.0007	<.0005	.0006	.0006
May 14	025	.0005			
	125	<.0005			
	225	<.0005			
	325	<.0005			
	425	<.0005			
	525	.0005			
	625	<.0005			
	725	.0006			

Station: Waneta
Metal: Total Cd (Cont'd)

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 14	825	.0007			
	900		<.0005	.0006	.0005
	1000		.0007	<.0005	<.0005
	1100		<.0005	<.0005	<.0005
	1200		<.0005	.0006	.0005
	1300		<.0005	<.0005	.0005
	1400		.0008	.0008	.0008
	1500		.0005	.0007	<.0005
	1600	<.0005	<.0005	<.0005	<.0005
	1700	<.0005			
	1800	<.0005			
	1900	<.0005			
	2000	<.0005	<.0005	<.0005	<.0005
May 15	800		.0007	.0007	.0008
	900		.0005	.0009	.0009

Station: Waneta
Metal: Total Cu

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 12	922		<.001	.001	.001
	1001	.004			
	1100	.002	.001	.001	.002
	1200	.002	.002	.002	.002
	1300	.002	.002	.002	.001
	1400	.003	.002	.002	.002
	1500	.002	.002	.002	.002
	1600	.003	.002	.002	.002
	1700	.002	.002	.002	.002
	1800	.001			
	1900	.003			
	2000	.04			
	2100	.004			
	2200	.003			
	2300	.002			
	2400	.001			
May 13	100	.003			
	200	.002			
	300	.005			
	400	.007			
	500	.007			
	600	.003			
	700	.006			
	800	.002			
	900	.001			
	1000	.002	.002	.001	.001
	1100	.002			
	1200		.002	.002	.002
	1225	<.001			
	1300		.002	.001	.001
	1400	.002	.001	.002	.002
	1500	.002	.002	.002	.002
	1600		.003		
	1700	.002			
	1800	.003			
	2100	.002	.002	.002	.003
	2200		.002	.002	.002
	2325	.004	.002	.003	.002
May 14	025	.005			
	125	.003			
	225	.002			
	325	.005			
	425	.002			
	525	.002			
	625	.002			
	725	.005			

Station: Waneta
Metal: Total Cu (Cont'd)

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 14	825	.006			
	900		.003	.002	.002
	1000		.002	.003	.002
	1100		.002	.002	.003
	1200		.003	.003	.003
	1300		.002	.002	.002
	1400		.002	.004	.003
	1500		.003	.002	.002
	1600	.003	.002	.003	.003
	1700	.003			
	1800	.003			
	1900	.004			
	2000	.003	.010	.001	.001
May 15	800		.001	.001	.001
	900		.001	.001	.001

Station: Waneta
Metal: Total Pb

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 12	922		.003	.003	.004
	1001	.004			
	1100	.002	.002	.001	.002
	1200	.002	.004	.003	.002
	1300	.001	.003	.003	.001
	1400	.004	.009	.005	.004
	1500	.003	.003	.005	.003
	1600	.004	.004	.003	.003
	1700	.005	.005	.004	.008
	1800	.002			
	1900	.005			
	2000	.005			
	2100	.002			
	2200	.003			
	2300	.002			
	2400	.002			
May 13	100	.003			
	200	.001			
	300	.006			
	400	.011			
	500	.012			
	600	.005			
	700	.006			
	800	.005			
	900	<.001			
	1000	.002	.001	<.001	<.001
	1100	.004			
	1200		.001	.002	.002
	1225	<.001			
	1300		.005	.003	.007
	1400	.006	.005	.010	.009
	1500	.010	.009	.010	.009
	1600		.009		
	1700	.009			
	1800	.010			
	2100	.005	.005	.005	.005
	2200		.004	.005	.004
	2325	.008	.005	.007	.006
May 14	025	.008			
	125	.005			
	225	.005			
	325	.005			
	425	.005			
	525	.004			
	625	.004			
	725	.002			

Station: Waneta
Metal: Total Pb (Cont'd)

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 14	825	.005			
	900		.004	.004	.004
	1000		.007	.004	.004
	1100		.004	.002	.004
	1200		.006	.006	.006
	1300		.001	.002	.002
	1400		.010	.009	.010
	1500		.008	.008	.007
	1600	.005	.004	.003	.005
	1700	.002			
	1800	.008			
	1900	.003			
	2000	.002	.003	.004	.005
May 15	800		.010	.009	.010
	900		.010	.008	.008

Station: Waneta
Metal: Total Zn

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 12	922		.018	.027	.030
	1001	.04			
	1100	.026	.026	.026	.025
	1200	.020	.031	.028	.026
	1300	.016	.029	.031	.021
	1400	.05	.05	.05	.04
	1500	.04	.04	.04	.04
	1600	.04	.05	.027	.04
	1700	.028	.030	.021	.031
	1800	.019			
	1900	.021			
	2000	.030			
	2100	.023			
	2200	.023			
	2300	.022			
	2400	.031			
May 13	100	.04			
	200	.04			
	300	.04			
	400	.07			
	500	.05			
	600	.04			
	700	.030			
	800	.025			
	900	.024			
	1000	.027	.030	.031	.029
	1100	.032			
	1200		.023	.025	.020
	1225	.019			
	1300		.019	.017	.022
	1400	.029	.022	.032	.026
	1500	.036	.030	.033	.027
	1600		.013		
	1700	.024			
	1800	.032			
	2100	.023	.023	.020	.023
	2200		.023	.020	.014
	2325	.029	.020	.025	.029
May 14	025	.020			
	125	.028			
	225	.028			
	325	.014			
	425	.023			
	525	.020			
	625	.020			
	725	.024			

Station: Waneta
Metal: Total Zn (Cont'd)

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 14	825	.018			
	900		.020	.021	.021
	1000		.031	.020	.021
	1100		.022	.015	.017
	1200		.021	.016	.021
	1300		.014	.020	.015
	1400		.025	.023	.026
	1500		.026	.022	.017
	1600	.021	.023	.021	.018
	1700	.041			
	1800	.036			
	1900	.025			
	2000	.020	.026	.022	.022
May 15	800		.06	.06	.06
	900		.06	.06	.06

Station: Waneta
Metal: Extractable As

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 12	922		.0005	.0005	.0005
	1001	.0005			
	1100	.0004	.0005	.0005	.0005
	1200	.0005	.0005	.0005	.0005
	1300	.0005	.0005	.0005	.0005
	1400	.0005	.0006	.0005	.0006
	1500	.0005	.0005	.0004	.0005
	1600	.0004	.0005	.0005	.0005
	1700	.0004	.0004	.0004	.0004
	1800	.0004			
	1900	.0004			
	2000	.0004			
	2100	.0003			
	2200	.0003			
	2300	.0003			
	2400	.0003			
May 13	100	.0003			
	200	.0003			
	300	.0004			
	400	.0004			
	500	.0003			
	600	.0003			
	700	.0003			
	800	.0003			
	900	.0003			
	1000	.0003	.0003	.0003	.0003
	1100	.0003			
	1200		.0004	.0003	.0004
	1225	.0004			
	1300		.0004	.0004	.0004
	1400	.0003	.0003	.0004	.0004
	1500	.0004	.0004	.0004	.0004
	1600		.0004		
	1700	.0004			
	1800	.0004			
	2100	.0004	.0004	.0004	.0004
	2200	.0004	.0004	.0004	.0004
	2325	.0003	.0003	.0003	.0002
May 14	025	.0003			
	125	.0003			
	225	.0003			
	325	.0003			
	425	.0003			
	525	.0003			
	625	.0003			
	725	.0003			

Station: Waneta
Metal: Extractable As (Cont'd)

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 14	825	.0003			
	900		.0003	.0003	.0003
	1000		.0003	.0003	.0003
	1100		.0004	.0004	.0004
	1200		.0004	.0004	.0004
	1300		.0004	.0004	.0004
	1400		.0004	.0004	.0004
	1500		.0004	.0004	.0004
	1600	.0004	.0004	.0004	.0004
	1700	.0004			
	1800	.0003			
	1900	.0003			
	2000	.0003	.0003	.0003	.0003
May 15	800		.0004	.0004	.0004
	900		.0004	.0004	.0004

Station: Waneta
Metal: Extractable Hg (ug/L)

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 12	922		<.05	<.05	<.05
	1001	.3			
	1100	<.05	<.05	<.05	<.05
	1200	<.05	<.05	<.05	<.05
	1300	<.05	<.05	<.05	<.05
	1400	<.05	<.05	<.05	<.05
	1500	<.05	<.05	<.05	<.05
	1600	<.05	<.05	<.05	<.05
	1700	<.05	<.05	<.05	<.05
	1800	<.05			
	1900	<.05			
	2000	<.05			
	2100	<.05			
	2200	<.05			
	2300	<.05			
	2400	<.05			
May 13	100	<.05			
	200	<.05			
	300	<.05			
	400	<.05			
	500	<.05			
	600	<.05			
	700	<.05			
	800	<.05			
	900	<.05			
	1000	<.05	<.05	<.05	<.05
	1100	<.05			
	1200		<.05	<.05	<.05
	1225	<.05			
	1300		<.05	<.05	<.05
	1400	<.05	<.05	.23	<.05
	1500	<.05	<.05	<.05	<.05
	1600		<.05		
	1700	<.05			
	1800	<.05			
	2100	<.05	<.05	<.05	<.05
	2200		<.05	<.05	<.05
	2325	<.05	<.05	<.05	<.05
May 14	025	<.05			
	125	<.05			
	225	<.05			
	325	<.05			
	425	<.05			
	525	<.05			
	625	<.05			
	725	<.05			

Station: Waneta
Metal: Extractable Hg (Cont'd)

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 14	825	<.05			
	900		<.05	<.05	<.05
	1000		<.05	<.05	<.05
	1100		<.05	<.05	<.05
	1200		<.05	<.05	<.05
	1300		<.05	<.05	<.05
	1400		<.05	<.05	<.05
	1500		<.05	<.05	<.05
	1600	<.05	<.05	<.05	<.05
	1700	<.05			
	1800	<.05			
	1900	<.05			
	2000	<.05	<.05	<.05	<.05
May 15	800		<.05	<.05	<.05
	900		<.05	<.05	<.05

Station: Waneta
Metal: Extractable Se

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 12	922		.0001	.0001	.0001
	1001	.0001			
	1100	.0001	.0001	.0001	.0001
	1200	.0001	.0001	.0001	.0001
	1300	.0001	.0001	.0001	.0001
	1400	.0001	.0001	.0001	.0001
	1500	.0001	.0001	.0001	.0001
	1600	<.0001	.0001	.0001	.0001
	1700	.0001	.0001	.0001	.0001
	1800	.0001			
	1900	.0001			
	2000	.0001			
	2100	.0001			
	2200	.0001			
	2300	<.0001			
	2400	.0001			
May 13	100	.0001			
	200	.0001			
	300	.0001			
	400	.0001			
	500	.0001			
	600	.0001			
	700	.0001			
	800	.0001			
	900	.0001			
	1000	.0001	.0001	.0001	.0001
	1100	.0001			
	1200		.0001	.0001	.0001
	1225	.0001			
	1300		.0001	.0001	.0001
	1400	.0001	.0001	.0001	.0001
	1500	.0001	.0001	.0001	.0001
	1600		.0001		
	1700	.0001			
	1800	.0001			
	2100	.0001	.0001	.0001	<.0001
	2200	.0001	.0001	.0001	.0001
	2325		.0001	.0001	.0001
May 14	025	.0001			
	125	.0001			
	225	.0001			
	325	.0001			
	425	.0001			
	525	.0001			
	625	.0001			
	725	.0001			

Station: Waneta
Metal: Extractable Se (Cont'd)

Date	Time	Auto. Sampler (Manning)	Quality Control (Replicates)		
May 14	825	.0001			
	900		.0001	.0001	.0001
	1000		.0001	.0001	.0001
	1100		.0001	.0001	.0001
	1200		.0001	.0001	.0001
	1300		.0001	.0001	.0001
	1400		.0001	.0001	.0001
	1500		.0001	<.0001	.0001
	1600	.0001	<.0001	.0001	.0001
	1700	.0001			
	1800	.0001			
	1900	.0001			
	2000	.0001	.0001	.0001	.0001
May 15	800		.0001	.0001	.0001
	900		.0001	.0001	.0001

Table 31a

Concentrations (mg/L) of metals in samples collected at Birchbank, October 17, - October 20, 1983.

Station: Birchbank
Metal: Cd

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved
October 17	2100	.028		
	2200	.0035		
	2300	.0006		
	2305		<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	2400	<.0005		
October 18	100	.025		
	200	<.0005		
	300	<.0005		
	400	<.0005		
	500	<.0005		
	600	<.0005		
	700	<.0005		
	800	<.0005		
	900	<.0005	<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	1000	<.0005		
	1100	<.0005		
	1200	.0032		
	1300	<.0005	<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	1400	<.0005		
	1500	<.0005		
	1600	<.0005		
	1700	<.0005		
	1800	<.0005		
	1900	.0013		
	2000	<.0005		
	2100	<.0005		
	2200	.0008		
	2300	<.0005		
	2400	<.0005	<.001	<.0005
			<.001	<.0005
			<.001	<.0005
October 19	100	<.0005		
	300	<.0005		
	400	<.0005		
	500	<.0005		
	600	<.0005		
	700	<.0005		
	900	<.0005	<.001	<.0005
			<.001	<.0005
			<.001	<.0005

Station: Birchbank
Metal: Cd (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved
October 19	1000	<.0005		
	1200	<.0005		
	1300	<.0005		
	1400	<.0005		
	1500	<.0005		
	1600	<.0005	<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	1700	<.0005		
	1800	<.0005		
	1900	<.0005		
	2000	<.0005	<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	2100	<.0005		
	2200	.0027		
	2300	.0008		
	2400	<.0005		
October 20	100	<.0005		
	200	.0035		
	300	.0006		
	400	<.0005	<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	500	<.0005		
	600	<.0005		
	700	<.0005		
	800	<.0005		
	900	<.0005		
	1000	<.0005		
	1100	<.0005	.004	<.0005
			.005	<.0005
			.003	<.0005
	1200	<.0005		
	1300	<.001		
	1400	<.001		
	1500	<.001		
	1600		<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	1800	<.001		
	1900	<.001		
	2000	<.001		
	2100	<.001		

Station: Birchbank
Metal: Cu

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved
October 17	2100	.016		
	2200	.012		
	2300	.008		
	2305		<.001	.001
			<.001	.002
			<.001	<.001
	2400	.009		
October 18	100	.007		
	200	.006		
	300	.005		
	400	.004		
	500	.005		
	600	.004		
	700	.003		
	800	.004		
	900	.005	.002	.002
			.002	<.001
			<.001	.001
	1000	.005		
	1100	.004		
	1200	.003		
	1300	.005	.002	<.001
			<.001	.001
			.001	.001
	1400	.005		
	1500	.002		
	1600	.004		
	1700	.003		
	1800	.005		
	1900	.008		
	2000	.005		
	2100	.005		
	2200	.003		
	2300	.004		
	2400	.004	<.001	<.001
			.002	.001
			.004	<.001
October 19	100	.003		
	300	.003		
	400	.010		
	500	.008		
	600	.003		
	700	.003		
	900	.003	.002	<.001
			.002	.001
			.003	<.001

Station: Birchbank
Metal: Cu (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved
October 19	1000	.004		
	1200	.004		
	1300	.004		
	1400	.003		
	1500	.003		
	1600	.003	.003	.002
			.002	<.001
			.004	.001
	1700	.004		
	1800	.006		
	1900	.005		
	2000	.003	.002	<.001
			.001	<.001
			.001	<.001
	2100	.003		
	2200	.003		
	2300	.007		
	2400	.003		
October 20	100	.003		
	200	.003		
	300	.002		
	400	.002	<.001	<.001
			.002	<.001
			.002	<.001
	500	.001		
	600	.002		
	700	.001		
	800	.002		
	900	.002		
	1000	.002		
	1100	.003	.002	<.001
			.002	.001
			.001	.001
	1200	.004		
	1300	.003		
	1400	.004		
	1500	.003		
	1600		.001	<.001
			.002	<.001
			.002	<.001
	1800	.004		
	1900	.004		
	2000	.003		
	2100	.003		

Station: Birchbank
Metal: Fe

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 17	2100	.038			
	2200	.031			
	2300	.048			
	2305		<.02	.014	
			.027	.007	*
			.059	.007	
	2400	.041			
October 18	100	.048			
	200	.031			
	300	.024			
	400	.022			
	500	.019			
	600	.038			
	700	.038			
	800	.023			
	900	.024	.036	.016	
			.032	.009	.28
			.041	.006	
	1000	.07			
	1100	.025			
	1200	.027			
	1300	.027	.029	.005	
			.037	.005	.29
			.039	.020	
	1400	.025			
	1500	.022			
	1600	.042			
	1700	.021			
	1800	.025			
	1900	.038			
	2000	.033			
	2100	.015			
	2200	.035			
	2300	.023			
	2400	.033	.034	.010	
			.031	.007	.26
			.029	.007	
October 19	100	.029			
	300	.023			
	400	.033			
	500	.024			
	600	.037			
	700	.024			
	900	.025	.024	.004	
			.06	.18	1.43
			.05	.007	

Station: Birchbank
Metal: Fe (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 19	1000	.042			
	1200	.025			
	1300	.029			
	1400	.027			
	1500	.025			
	1600	.031	.28	.029	
			.05	.012	.17
			.043	.022	
	1700	.029			
	1800	.040			
	1900	.041			
	2000	.047	.040	.021	
			.08	.007	.27
			.07	.024	
	2100	.045			
	2200	.023			
	2300	.06			
	2400	.017			
October 20	100	.026			
	200	.023			
	300	.024			
	400	.021	.025	.005	
			.035	.007	.16
			.05	.006	
	500	.023			
	600	.022			
	700	.026			
	800	.024			
	900	.023			
	1000	.021			
	1100	.045	.07	.012	
			.065	.010	.15
			.06	.008	
	1200	.034			
	1300	.05			
	1400	.037			
	1500	.06			
	1600		.06	.007	
			.037	.007	.14
			.039	.005	
	1800	.035			
	1900	.033			
	2000	.038			
	2100	.06			

Station: Birchbank
Metal: Mn

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved
October 17	2100	<.01		
	2200	<.01		
	2300	<.01		
	2305		<.01	<.01
			<.01	<.01
			<.01	<.01
	2400	<.01		
October 18	100	<.01		
	200	<.01		
	300	<.01		
	400	<.01		
	500	<.01		
	600	<.01		
	700	<.01		
	800	<.01		
	900	<.01	<.01	<.01
			<.01	<.01
			<.01	<.01
	1000	<.01		
	1100	<.01		
	1200	<.01		
	1300	<.01	<.01	<.01
			<.01	<.01
			<.01	<.01
	1400	<.01		
	1500	<.01		
	1600	<.01		
	1700	<.01		
	1800	<.01		
	1900	<.01		
	2000	<.01		
	2100	<.01		
	2200	<.01		
	2300	<.01		
	2400	<.01	<.01	<.01
			<.01	<.01
			<.01	<.01
October 19	100	<.01		
	300	<.01		
	400	<.01		
	500	<.01		
	600	<.01		
	700	<.01		
	900	<.01	<.01	<.01
			<.01	<.01
			<.01	<.01

Station: Birchbank
Metal: Mn (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved
October 19	1000	<.01		
	1200	<.01		
	1300	<.01		
	1400	<.01		
	1500	<.01		
	1600	<.01	<.01	<.01
			<.01	<.01
			<.01	<.01
	1700	<.01		
	1800	<.01		
	1900	<.01		
	2000	<.01	<.01	<.01
			<.01	<.01
			<.01	<.01
	2100	<.01		
	2200	<.01		
	2300	<.01		
	2400	<.01		
October 20	100	<.01		
	200	<.01		
	300	<.01		
	400	<.01	<.01	<.01
			<.01	<.01
			<.01	<.01
	500	<.01		
	600	<.01		
	700	<.01		
	800	<.01		
	900	<.01		
	1000	<.01		
	1100	<.01	<.01	<.01
			<.01	<.01
			<.01	<.01
	1200	<.01		
	1300	<.01		
	1400	<.01		
	1500	<.01		
	1600		<.01	<.01
			<.01	<.01
			<.01	<.01
	1800	<.01		
	1900	<.01		
	2000	<.01		
	2100	<.01		

Station: Birchbank
Metal: Pb

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved
October 17	2100	.002		
	2200	.003		
	2300	.001		
	2305		<.001	<.001
			<.001	<.001
			<.001	<.001
	2400	.003		
October 18	100	.002		
	200	.003		
	300	.003		
	400	.003		
	500	.003		
	600	.001		
	700	.003		
	800	.003		
	900	.001	<.001	.001
			.003	<.001
			<.001	<.001
	1000	.002		
	1100	.002		
	1200	.004		
	1300	.004	<.001	<.001
			<.001	<.001
			.002	.001
	1400	.007		
	1500	.003		
	1600	.004		
	1700	.004		
	1800	.004		
	1900	.004		
	2000	.007		
	2100	.005		
	2200	.004		
	2300	.005		
	2400	.004	<.001	<.001
			<.001	<.001
			<.001	.001
October 19	100	.004		
	300	.004		
	400	.005		
	500	.005		
	600	.005		
	700	.005		
	900	.004	<.001	<.001
			<.001	<.001
			<.001	.001

Station: Birchbank
Metal: Pb (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved
October 19	1000	.006		
	1200	.004		
	1300	.004		
	1400	.004		
	1500	.004		
	1600	.003	.001	<.001
			<.001	.001
			.002	<.001
	1700	.004		
	1800	.004		
	1900	.003		
	2000	.003	.001	.001
			.003	<.001
			<.001	<.001
	2100	.003		
	2200	.005		
	2300	.003		
	2400	.003		
October 20	100	.002		
	200	.002		
	300	.002		
	400	.002	<.001	.001
			<.001	<.001
			<.001	<.001
	500	.003		
	600	.002		
	700	.002		
	800	.002		
	900	.003		
	1000	.002		
	1100	.002	.002	<.001
			.002	.001
			.001	<.001
	1200	.002		
	1300	.003		
	1400	.003		
	1500	.003		
	1600		<.001	.001
			<.001	.001
			<.001	.001
	1800	.001		
	1900	.002		
	2000	.001		
	2100	.002		

Station: Birchbank
Metal: Zn

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 17	2100	.003			
	2200	.002			
	2300	.002			
	2305		<.001	.001	
			<.001	<.001	*
			<.001	<.001	
	2400	.003			
October 18	100	.004			
	200	.001			
	300	.002			
	400	.003			
	500	.002			
	600	.003			
	700	.004			
	800	.003			
	900	.003	.004	<.001	
			.004	<.001	*
			.003	<.001	
	1000	.004			
	1100	.002			
	1200	.003			
	1300	.002	.002	<.001	
			.005	<.001	*
			.002	<.001	
	1400	.002			
	1500	.002			
	1600	.002			
	1700	.002			
	1800	.002			
	1900	.003			
	2000	.003			
	2100	.001			
	2200	.002			
	2300	.002			
	2400	.002	<.001	<.001	
			.001	.002	*
			.003	<.001	
October 19	100	.002			
	300	.002			
	400	.003			
	500	.003			
	600	.003			
	700	.002			
	900	.002	.002	<.001	
			.001	<.001	*
			.003	<.001	

Station: Birchbank
Metal: Zn (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 19	1000	.003			
	1200	.005			
	1300	.005			
	1400	.007			
	1500	.006			
	1600	.005	.004	.002	
			.005	.001	.24
			.008	.001	
	1700	.005			
	1800	.007			
	1900	.005			
	2000	.03	.004	.001	
			.007	.002	.31
			.002	.001	
	2100	.005			
	2200	.005			
	2300	.005			
	2400	.005			
October 20	100	.005			
	200	.005			
	300	.004			
	400	.002	<.001	<.001	
			.002	<.001	*
			.001	.001	
	500	.003			
	600	.002			
	700	.003			
	800	.004			
	900	.004			
	1000	.003			
	1100	.004	.007	.002	
			.008	.002	.26
			.004	.001	
	1200	.005			
	1300	.008			
	1400	.008			
	1500	.010			
	1600		<.001	.001	
			.002	<.001	*
			.003	<.001	
	1800	.006			
	1900	.005			
	2000	.004			
	2100	.006			

Station: Birchbank
Extractable Metals (Hg measured in ug/L)

Date	Time	As	Se	Hg
October 17	2305	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
October 18	900	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
	1300	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
	1900	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
	2400	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
October 19	900	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
	1600	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
	2000	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
October 20	400	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
	1100	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05
	1600	.0001	<.0001	<.05
		.0001	<.0001	<.05
		.0001	<.0001	<.05

Table 31b

Concentrations (mg/L) of metals in samples collected at Waneta, October 17, - October 20, 1983.

Station: Waneta
Metal: Cd

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved
October 17	2200	.001		
	2300	<.001		
	2400	<.001		
October 18	200	<.001		
	205		<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	300	<.001		
	400	<.001		
	500	.012		
	600	.008		
	700	<.001		
	800	<.001		
	1102		<.001	.0005
			<.001	.0006
			<.001	<.0005
	1200	<.001		
	1300	<.001		
	1400	.001		
	1500	.001		
	1600	.001		
	1700	<.001		
	1702		<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	1800	.010		
	1900	.001		
	2000	.002		
	2100	.002		
	2200	<.001		
	2201		<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	2300	<.001		
	2400	<.001		
October 19	100	<.001		
	200	<.001		
	300	<.001	.003	<.0005
			.002	<.0005
			<.001	.0005
	400	<.001		
	500	<.001		
	600	<.001		
	700	<.001		
	800	<.001		
	900	<.001		
	1000	.001		
	1100	.001		

Station: Waneta
Metal: Cd (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved
October 19	1102		<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	1200	<.001		
	1300	.001		
	1400	.001		
	1402		<.001	<.0005
			<.001	<.0005
			<.001	<.0005
	1500	.001		
	1600	<.001		
	1700	<.001		
	1800	<.001	<.001	<.0005
			<.001	<.0005
			<.001	<.001
	1900	.001		
	2000	<.001		
	2100	<.001		
	2200	<.001		
	2300	<.001		
	2400	<.001		
October 20	100	.001	<.001	<.001
			<.001	<.001
			<.001	
	200	.001		
	700	.001		
	800	.001		
	900	.001	<.001	<.001
			<.001	<.001
	1000	<.001		
	1100	<.001		
	1200	<.001		
	1300	.001		
	1400	.001	<.001	<.001
			<.001	<.001
			<.001	<.001
	1500	<.001		
	1600	<.001		
	1700	<.001		
	1800	<.001		
	1900	<.001		
	2000	<.001		
	2100	<.001		
	2200	<.001	<.001	<.001
			<.001	<.001
			<.001	<.001
	2300	<.001		

Station: Waneta
Metal: Cu

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 17	2200	.031			
	2300	.011			
	2400	.008			
October 18	200	.012			
	205		.004	.002	
			.004	.001	.36
			.003	.001	
	300	.005			
	400	.006			
	500	.026			
	600	.019			
	700	.021			
	800	.008			
	1102		.002	.002	
			.003	.001	.45
			.006	.002	
	1200	.010			
	1300	.009			
	1400	.006			
	1500	.006			
	1600	.018			
	1700	.027			
	1702		.003	<.001	
			.004	.001	*
			.004	.001	
	1800	.005			
	1900	.005			
	2000	.005			
	2100	.007			
	2200	.009			
	2201		.003	.001	
			.003	.002	.50
			.002	.001	
	2300	.004			
	2400	.004			
October 19	100	.005			
	200	.004			
	300	.003	.008	.003	
			.006	.002	.35
			.006	.002	
	400	.005			
	500	.005			
	600	.013			
	700	.019			
	800	.009			
	900	.006			
	1000	.004			
	1100	.004			

Station: Waneta
Metal: Cu (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 19	1102		.003	.001	
			.002	.001	.43
			.002	.001	
	1200	.003			
	1300	.004			
	1400	.005			
	1402		.004	.002	
			.002	.001	.50
			.002	.001	
	1500	.011			
	1600	.006			
	1700	.005			
	1800	.006	.003	.001	
			.004	.001	.40
			.003	.002	
	1900	.016			
	2000	.004			
	2100	.004			
	2200	.003			
	2300	.003			
	2400	.004			
October 20	100	.006	.007	.003	
			.009	.002	.31
			.008		
	200	.008			
	700	.007			
	800	.005			
	900	.004	.004	.002	.63
			.004	.003	
	1000	.004			
	1100	.003			
	1200	.004			
	1300	.004			
	1400	.006	.005	.002	
			.006	.003	.44
			.005	.002	
	1500	.011			
	1600	.040			
	1700	.003			
	1800	.004			
	1900	.004			
	2000	.005			
	2100	.003			
	2200	.004	.004	.002	
			.005	.002	.46
			.004	.002	
	2300	.002			

Station: Waneta
Metal: Fe

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 17	2200	.09			
	2300	.13			
	2400	.09			
October 18	200	.29			
	205		.10	.007	
			.06	.011	.12
			.04	.006	
	300	.10			
	400	.15			
	500	.43			
	600	.34			
	700	.08			
	800	.10			
	1102		.09	.007	
			.08	.012	.08
			.20	.011	
	1200	.19			
	1300	.17			
	1400	.06			
	1500	.14			
	1600	.85			
	1700	.16			
	1702		.05	.010	
			.06	.008	.12
			.08	.005	
	1800	.09			
	1900	.08			
	2000	.06			
	2100	.05			
	2200	.09			
	2201		.07	.007	
			.06	.07	.44
			.06	.007	
	2300	.05			
	2400	.05			
October 19	100	.06			
	200	.038			
	300	.05	.50	.008	
			.34	.011	.03
			.28	.019	
	400	.15			
	500	.18			
	600	.69			
	700	.83			
	800	.40			
	900	.24			
	1000	.12			
	1100	.09			

Station: Waneta
Metal: Fe (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 19	1102		.036	.004	
			.035	.004	.13
			.040	.006	
	1200	.05			
	1300	.08			
	1400	.08			
	1402		.036	.005	
			.040	.006	.15
			.032	.005	
	1500	.35			
	1600	.17			
	1700	.05			
	1800	.11	.033	.007	
			.042	.007	.24
			.047	.015	
	1900	.88			
	2000	.10			
	2100	.06			
	2200	.08			
	2300	.05			
	2400	.07			
October 20	100	.12	.33	.013	
			.35	.006	.03
			.38		
	200	.31			
	700	.20			
	800	.09			
	900	.13	.16	.016	.19
			.19	.049	
	1000	.08			
	1100	.10			
	1200	.09			
	1300	.12			
	1400	.13	.08	.036	
			.15	.010	.15
			.14	.011	
	1500	.62			
	1600	.21			
	1700	.05			
	1800	.05			
	1900	.04			
	2000	.09			
	2100	.06			
	2200	.10	.11	.011	
			.12	.011	.09
			.12	.010	
	2300	.05			

Station: Waneta
Metal: Mn

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved
October 17	2200	<.01		
	2300	<.01		
	2400	<.01		
October 18	200	.01		
	205		<.01	<.01
			<.01	<.01
			<.01	<.01
	300	<.01		
	400	<.01		
	500	.02		
	600	.01		
	700	<.01		
	800	<.01		
	1102		<.01	<.01
			<.01	<.01
			<.01	<.01
	1200	<.01		
	1300	<.01		
	1400	<.01		
	1500	<.01		
	1600	.02		
	1700	<.01		
	1702		<.01	<.01
			.01	<.01
			.01	<.01
	1800	<.01		
	1900	<.01		
	2000	<.01		
	2100	<.01		
	2200	<.01		
	2201		<.01	<.01
			<.01	<.01
			<.01	<.01
	2300	<.01		
	2400	<.01		
October 19	100	<.01		
	200	<.01		
	300	<.01	<.01	<.01
			<.01	<.01
			.01	<.01
	400	<.01		
	500	<.01		
	600	.02		
	700	.02		
	800	.01		
	900	<.01		
	1000	<.01		
	1100	<.01		

Station: Waneta
Metal: Mn (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved
October 19	1102		.01	<.01
			<.01	<.01
			<.01	<.01
	1200	<.01		
	1300	<.01		
	1400	<.01		
	1402		<.01	<.01
			<.01	<.01
			.01	<.01
	1500	.01		
	1600	<.01		
	1700	<.01		
	1800	<.01	<.01	<.01
			<.01	<.01
			.01	<.02
	1900	.02		
	2000	<.01		
	2100	<.01		
	2200	<.01		
	2300	<.01		
	2400	<.01		
October 20	100	<.01	.01	<.02
			.01	<.02
			.02	
	200	<.01		
	700	<.01		
	800	<.01		
	900	<.01	.01	<.02
			.01	<.02
	1000	<.01		
	1100	<.01		
	1200	<.01		
	1300	<.01		
	1400	<.01	<.01	<.02
			.01	<.02
			.01	<.02
	1500	.01		
	1600	<.01		
	1700	<.01		
	1800	<.01		
	1900	<.01		
	2000	<.01		
	2100	<.01		
	2200	<.01	.01	<.02
			<.01	<.02
			.01	<.02
	2300	<.01		

Station: Waneta
Metal: Pb

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 17	2200	.009			
	2300	.005			
	2400	.004			
October 18	200	.013			
	205		.005	.001	
			.004	.002	.42
			.003	.002	
	300	.007			
	400	.005			
	500	.056			
	600	.041			
	700	.005			
	800	.006			
	1102		.007	.003	
			.007	.003	.36
			.011	.003	
	1200	.007			
	1300	.008			
	1400	.008			
	1500	.009			
	1600	.012			
	1700	.013			
	1702		.011	.004	
			.013	.004	.30
			.013	.003	
	1800	.017			
	1900	.012			
	2000	.009			
	2100	.007			
	2200	.008			
	2201		.007	.002	
			.007	.003	.38
			.007	.003	
	2300	.007			
	2400	.006			
October 19	100	.006			
	200	.005			
	300	.005	.019	.003	
			.014	.001	.16
			.012	.003	
	400	.008			
	500	.005			
	600	.014			
	700	.012			
	800	.010			
	900	.007			
	1000	.005			
	1100	.004			

Station: Waneta
Metal: Pb (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 19	1102		.004	.002	
			.003	.002	.60
			.003	.002	
	1200	.005			
	1300	.007			
	1400	.007			
	1402		.006	.003	
			.007	.003	.35
			.007	.001	
	1500	.011			
	1600	.008			
	1700	.006			
	1800	.009	.007	.002	
			.007	.003	.32
			.008	.002	
	1900	.013			
	2000	.008			
	2100	.007			
	2200	.007			
	2300	.006			
	2400	.010			
October 20	100	.007	.015	.002	
			.016	.002	.13
			.017		
	200	.011			
	700	.006			
	800	.008			
	900	.006	.009	.002	.21
			.010	.002	
	1000	.005			
	1100	.004			
	1200	.003			
	1300	.004			
	1400	.010	.008	.002	
			.007	.002	.26
			.008	.002	
	1500	.008			
	1600	.010			
	1700	.008			
	1800	.007			
	1900	.007			
	2000	.007			
	2100	.006			
	2200	.011	.008	<.001	
			.009	.001	*
			.008	.001	
	2300	.005			

Station: Waneta
Metal: Zn

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 17	2200	.061			
	2300	.029			
	2400	.022			
October 18	200	.040			
	205		.020	.011	
			.020	.012	.60
			.017	.011	
	300	.029			
	400	.023			
	500	.303			
	600	.220			
	700	.062			
	800	.019			
	1102		.020	.010	
			.020	.011	.48
			.029	.012	
	1200	.029			
	1300	.036			
	1400	.016			
	1500	.017			
	1600	.084			
	1700	.032			
	1702		.020	.013	
			.026	.011	.49
			.027	.012	
	1800	.027			
	1900	.023			
	2000	.025			
	2100	.019			
	2200	.022			
	2201		.023	.015	
			.022	.013	.61
			.022	.013	
	2300	.019			
	2400	.015			
October 19	100	.015			
	200	.017			
	300	.016	.056	.015	
			.043	.020	.37
			.032	.013	
	400	.027			
	500	.024			
	600	.075			
	700	.090			
	800	.049			
	900	.039			
	1000	.022			
	1100	.020			

Station: Waneta
Metal: Zn (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
October 19	1102		.015	.012	
			.015	.013	.83
			.016	.013	
	1200	.019			
	1300	.021			
	1400	.022			
	1402		.016	.010	
			.015	.012	.76
			.014	.012	
	1500	.050			
	1600	.021			
	1700	.015			
	1800	.018	.013	.011	
			.017	.012	.70
			.017	.010	
	1900	.089			
	2000	.026			
	2100	.021			
	2200	.021			
	2300	.020			
	2400	.034			
October 20	100	.028	.045	.010	
			.051	.018	.27
			.057		
	200	.050			
	700	.037			
	800	.029			
	900	.025	.031	.014	.43
			.032	.013	
	1000	.022			
	1100	.024			
	1200	.021			
	1300	.021			
	1400	.026	.020	.010	
			.020	.010	.48
			.022	.010	
	1500	.064			
	1600	.045			
	1700	.019			
	1800	.044			
	1900	.018			
	2000	.017			
	2100	.032			
	2200	.020	.021	.010	
			.023	.011	.46
			.024	.010	
	2300	.014			

Station: Waneta
Extractable Metals (Hg measured in ug/L)

Date	Time	As	Se	Hg
October 18	205	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1102	.0003	<.0001	<.05
		.0002	<.0001	<.05
		.0003	<.0001	<.05
	1702	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0004	<.0001	<.05
	2201	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
October 19	300	.0002	<.0001	<.05
		.0002	<.0001	<.05
		.0003	<.0001	.08
	1102	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1402	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1800	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
October 20	100	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	900	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1400	.0003	<.0001	<.05
		.0002	<.0001	<.05
		.0003	<.0001	<.05
	2200	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05

Table 32a

Concentrations (usually mg/L) of metals and other parameters in samples collected at Birchbank, March 26 - March 30, 1984.

Station: Birchbank
Metal: Cd

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.0008			
	1200	<.0005			
	1300	<.0005			
	1400	<.0005			
	1500	<.0005	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	1600	<.0005			
	1700	<.0005			
	1800	<.0005			
	1900	<.0005			
	2000	<.0005			
	2200	<.0005	<.0005	<.0005	
			<.0005	.0005	*
			<.0005	<.0005	
	2300	<.0005			
	2400	<.0005			
March 27	100	-	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	200	.0014			
	500	<.0005			
	600	<.0005			
	900	.0008			
	1000	<.0005			
	1100	<.0005			
	1200	<.0005			
	1300	<.0005	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	1400	.0005			
	1500	<.0005			
	1600	<.0005			
	1700	<.0005			
	1800	<.0005			
	1900	<.0005			
	2000	<.0005			
	2100	<.0005	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	2200	<.0005			
	2300	<.0005			
March 28	100	<.0005	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	200	<.0005			
	300	<.0005			
	400	.0005			
	500	<.0005			

Station: Birchbank
Metal: Cd (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 28	600	<.0005	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	700	<.0005			
	800	<.0005			
	900	.0055			
	1000	<.0005			
	1100	.0009			
	1200	.0008	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	1300	<.0005			
	1400	<.0005			
	1500	<.0005			
	1600	.0006			
	1700	.0006	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	1800	<.0005			
	1900	<.0005			
	2000	<.0005			
	2100	<.0005			
	2200	<.0005			
	2300	<.0005			
	2400	<.0005			
March 29	100	<.0005			
	200	<.0005	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	300	<.0005			
	400	<.0005			
	500	.0050			
	600	<.0005			
	700	<.0005			
	800	<.0005			
	900	<.0005			
	1000	<.0005	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	1100	<.0005			
	1200	<.0005			
	1300	<.0005			
	1400	.0010			
	1500	.0006			
	1600	<.0005			
	1800	-	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	1900	<.0005			

Station: Birchbank
Metal: Cd (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	2000	<.0005			
	2100	<.0005			
	2200	<.0005			
	2300	<.0005			
	2400	<.0005			
March 30	100	<.0005			
	200	<.0005			
	300	<.0005			
	400	<.0005			
	500	<.0005			
	600	<.0005			
	700	<.0005			
	800	<.0005			
	900	<.0005			

Station: Birchbank
Metal: Cu

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.016			
	1200	.009			
	1300	.010			
	1400	.009			
	1500	.005	.001	.001	
			.002	.002	.80
			.002	.001	
	1600	.004			
	1700	.005			
	1800	.003			
	1900	.004			
	2000	.005			
	2200	.003	.002	.001	
			.003	.001	.71
			.002	.003	
	2300	.002			
	2400	.003			
March 27	100	-	.001	.002	
			.002	.004	1.40
			.002	.001	
	200	.004			
	500	.003			
	600	.003			
	900	.005			
	1000	.004			
	1100	.004			
	1200	.004			
	1300	.004	.003	.001	
			.002	<.001	*
			.002	<.001	
	1400	.004			
	1500	.005			
	1600	.004			
	1700	.009			
	1800	.005			
	1900	.004			
	2000	.004			
	2100	.003	.002	.002	
			<.001	<.001	*
			<.001	.001	
	2200	.004			
	2300	.003			
March 28	100	.002	<.001	<.001	
			<.001	<.001	*
			.001	<.001	
	200	.003			
	300	.004			
	400	.004			
	500	.003			

Station: Birchbank
Metal: Cu (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 28	600	.003	<.001	<.001	
			<.001	<.001	*
			.004	<.001	
	700	.003			
	800	.004			
	900	.002			
	1000	.003			
	1100	.005			
	1200	.004	.002	.004	
			.003	.001	*
			.001	<.001	
	1300	.003			
	1400	.004			
	1500	.002			
	1600	.003			
	1700	.003	.002	<.001	
			.003	.001	*
			.003	.001	
	1800	.003			
	1900	.003			
	2000	.003			
	2100	.002			
	2200	.002			
	2300	.007			
	2400	.002			
March 29	100	.002			
	200	.003	.002	<.001	
			.001	<.001	*
			.001	<.001	
	300	.002			
	400	.002			
	500	.003			
	600	.003			
	700	.002			
	800	.002			
	900	.006			
	1000	.003	.002	.001	
			.002	.001	*
			.002	<.001	
	1100	.004			
	1200	.005			
	1300	.004			
	1400	.006			
	1500	.005			
	1600	.005			
	1800	-	.002	.001	
			.002	<.001	*
			.006	<.001	
	1900	.003			

Station: Birchbank
Metal: Cu (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	2000	.003			
	2100	.003			
	2200	.003			
	2300	.002			
	2400	.002			
March 30	100	.005			
	200	.003			
	300	.007			
	400	.006			
	500	.003			
	600	.003			
	700	.002			
	800	.002			
	900	.002			

Station: Birchbank
Metal: Fe

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.042			
	1200	.05			
	1300	.024			
	1400	.042			
	1500	.046	.042	.006	
			.033	.017	.33
			.036	.014	
	1600	.043			
	1700	.042			
	1800	.038			
	1900	.040			
	2000	.042			
	2200	.026	.046	.008	
			.025	.006	.40
			.034	.028	
	2300	.036			
	2400	.038			
March 27	100	-	.030	.006	
			.025	.036	.53
			.035	.006	
	200	.038			
	500	.026			
	600	.024			
	900	.05			
	1000	.041			
	1100	.05			
	1200	.05			
	1300	.05	.034	.007	
			.040	.024	.44
			.030	.015	
	1400	.031			
	1500	.041			
	1600	.028			
	1700	.05			
	1800	.045			
	1900	.041			
	2000	.033			
	2100	.047	.036	.005	
			.035	.007	.16
			.035	.005	
	2200	.033			
	2300	.042			
March 28	100	.035	.027	.026	
			.031	.004	.42
			.034	.009	
	200	.028			
	300	.024			
	400	.029			
	500	.022			

Station: Birchbank
Metal: Fe (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 28	600	.043	.032	.004	
			.032	.008	.15
			.05	.005	
	700	.042			
	800	.043			
	900	.028			
	1000	.040			
	1100	.07			
	1200	.035	.030	.008	
			.033	.005	.22
			.030	.007	
	1300	.037			
	1400	.039			
	1500	.044			
	1600	.035			
	1700	.05	.041	.006	
			.030	.006	.14
			.07	.008	
	1800	.034			
	1900	.038			
	2000	.032			
	2100	.033			
	2200	.05			
	2300	.045			
	2400	.043			
March 29	100	.038			
	200	.042	.030	.004	
			.027	.005	.15
			.041	.006	
	300	.036			
	400	.036			
	500	.036			
	600	.039			
	700	.034			
	800	.032			
	900	.034			
	1000	.030	.036	.006	
			.028	.012	.25
			.038	.007	
	1100	.045			
	1200	.037			
	1300	.037			
	1400	.042			
	1500	.034			
	1600	.034			
	1800	-	.036	.017	
			.039	.015	.33
			.037	.005	
	1900	.025			

Station: Birchbank
Metal: Fe (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	2000	.037			
	2100	.025			
	2200	.022			
	2300	.020			
	2400	.028			
March 30	100	.027			
	200	.023			
	300	.037			
	400	.031			
	500	.033			
	600	.030			
	700	.025			
	800	.038			
	900	.034			

Station: Birchbank
Metal: Mn

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.01			
	1200	<.01			
	1300	<.01			
	1400	<.01			
	1500	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1600	<.01			
	1700	<.01			
	1800	<.01			
	1900	<.01			
	2000	<.01			
	2200	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	2300	<.01			
	2400	<.01			
March 27	100	-	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	200	<.01			
	500	<.01			
	600	<.01			
	900	<.01			
	1000	<.01			
	1100	<.01			
	1200	<.01			
	1300	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1400	<.01			
	1500	<.01			
	1600	<.01			
	1700	<.01			
	1800	<.01			
	1900	<.01			
	2000	<.01			
	2100	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	2200	<.01			
	2300	<.01			
March 28	100	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	200	<.01			
	300	<.01			
	400	<.01			
	500	<.01			

Station: Birchbank
Metal: Mn (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 28	600	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	700	<.01			
	800	<.01			
	900	<.01			
	1000	<.01			
	1100	<.01			
	1200	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1300	<.01			
	1400	<.01			
	1500	<.01			
	1600	<.01			
	1700	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1800	<.01			
	1900	<.01			
	2000	<.01			
	2100	<.01			
	2200	<.01			
	2300	<.01			
	2400	<.01			
March 29	100	<.01			
	200	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	300	<.01			
	400	<.01			
	500	<.01			
	600	<.01			
	700	<.01			
	800	<.01			
	900	<.01			
	1000	<.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1100	<.01			
	1200	<.01			
	1300	<.01			
	1400	<.01			
	1500	<.01			
	1600	<.01			
	1800	-	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1900	<.01			

Station: Birchbank
Metal: Mn (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	2000	<.01			
	2100	<.01			
	2200	<.01			
	2300	<.01			
	2400	<.01			
March 30	100	<.01			
	200	<.01			
	300	<.01			
	400	<.01			
	500	<.01			
	600	<.01			
	700	<.01			
	800	<.01			
	900	<.01			

Station: Birchbank
Metal: Pb

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.003			
	1200	.001			
	1300	<.001			
	1400	<.001			
	1500	.001	<.001	.003	
			<.001	.002	*
			<.001	<.001	
	1600	<.001			
	1700	<.001			
	1800	<.001			
	1900	<.001			
	2000	<.001			
	2200	<.001	<.001	.002	
			<.001	.002	*
			<.001	.002	
	2300	<.001			
	2400	.001			
March 27	100	-	<.001	.002	
			<.001	.002	*
			.008	.002	
	200	.002			
	500	<.001			
	600	<.001			
	900	.004			
	1000	<.001			
	1100	.001			
	1200	<.001			
	1300	<.001	.001	<.001	
			<.001	<.001	*
			<.001	<.001	
	1400	<.001			
	1500	.003			
	1600	.004			
	1700	.006			
	1800	.002			
	1900	.002			
	2000	.006			
	2100	.003	.001	<.001	
			.001	.001	*
			<.001	<.001	
	2200	.002			
	2300	.006			
March 28	100	.003	<.001	<.001	
			<.001	<.001	*
			.001	<.001	
	200	.003			
	300	.004			
	400	.005			
	500	<.001			

Station: Birchbank
Metal: Pb (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 28	600	<.001	<.001	<.001	
			.001	<.001	*
			.001	<.001	
	700	.002			
	800	.003			
	900	.003			
	1000	.004			
	1100	.005			
	1200	.002	.001	<.001	
			<.001	<.001	*
			<.001	<.001	
	1300	.017			
	1400	.002			
	1500	.001			
	1600	.001			
	1700	.005	<.001	<.001	
			<.001	<.001	*
			<.001	<.001	
	1800	.003			
	1900	.003			
	2000	.004			
	2100	.002			
	2200	<.001			
	2300	.002			
	2400	.002			
March 29	100	<.001			
	200	.006	<.001	<.001	
			<.001	<.001	*
			.001	<.001	
	300	<.001			
	400	<.001			
	500	.002			
	600	<.001			
	700	<.001			
	800	.001			
	900	<.001			
	1000	<.001	<.001	.002	
			<.001	.001	*
			<.001	.002	
	1100	.002			
	1200	.002			
	1300	.001			
	1400	<.001			
	1500	.001			
	1600	.001			
	1800	-	<.001	.002	
			<.001	.002	*
			.004	.001	
	1900	<.001			

Station: Birchbank
Metal: Pb (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	2000	<.001			
	2100	<.001			
	2200	<.001			
	2300	<.001			
	2400	<.001			
March 30	100	.001			
	200	<.001			
	300	.002			
	400	.001			
	500	<.001			
	600	.001			
	700	<.001			
	800	<.001			
	900	<.001			

Station: Birchbank
Metal: Zn

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.007			
	1200	.002			
	1300	.003			
	1400	.005			
	1500	.004	.004	.005	
			.005	.005	1.00
			.003	.002	
	1600	.004			
	1700	.002			
	1800	.005			
	1900	.003			
	2000	.002			
	2200	.003	.006	.003	
			.004	.002	.50
			.004	.002	
	2300	.009			
	2400	.006			
March 27	100	-	.003	.002	
			.003	.004	.53
			.009	.002	
	200	.006			
	500	.005			
	600	.004			
	900	.006			
	1000	.003			
	1100	.005			
	1200	.005			
	1300	.005	.004	<.001	
			.003	.001	*
			.004	.001	
	1400	.006			
	1500	.005			
	1600	.02			
	1700	.007			
	1800	.004			
	1900	.007			
	2000	.004			
	2100	.004	.003	<.001	
			.003	.001	*
			.003	<.001	
	2200	.003			
	2300	.004			
March 28	100	.005	.002	<.001	
			.003	<.001	*
			.005	.001	
	200	.005			
	300	.007			
	400	.011			
	500	.008			

Station: Birchbank
Metal: Zn (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 28	600	.002	.004	<.001	
			.004	.001	*
			.006	.001	
	700	.005			
	800	.004			
	900	.003			
	1000	.003			
	1100	.004			
	1200	.006	.006	.016	
			.006	.005	1.63
			.004	.005	
	1300	.04			
	1400	.014			
	1500	.003			
	1600	.012			
	1700	.007	.005	.003	
			.005	.003	.57
			.004	.002	
	1800	.003			
	1900	.004			
	2000	.002			
	2100	.003			
	2200	.003			
	2300	.006			
	2400	.01			
March 29	100	.003			
	200	.01	.005	.003	
			.003	<.001	*
			.004	.003	
	300	.003			
	400	.003			
	500	.004			
	600	.01			
	700	.004			
	800	.004			
	900	.009			
	1000	.003	.003	.002	
			.003	.002	.67
			.003	.002	
	1100	.005			
	1200	.005			
	1300	.006			
	1400	.007			
	1500	.013			
	1600	.006			
	1800	-	.003	.002	
			.003	.002	.50
			.006	.002	
	1900	.004			

Station: Birchbank
Metal: Zn (Cont'd)

Date	Time	Auto. Sampler (ISCO) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	2000	.013			
	2100	.003			
	2200	.005			
	2300	.005			
	2400	.004			
March 30	100	.005			
	200	.003			
	300	.003			
	400	.02			
	500	.015			
	600	.014			
	700	.003			
	800	.002			
	900	.002			

Birchbank Quality Controls
Extractable Metals (Hg is recorded in ug/l)

Date	Time	As	Se	Hg
March 26	1500	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	2200	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
March 27	100	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1300	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	2100	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
March 28	100	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	600	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1200	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1700	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
March 29	200	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1000	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05
	1800	.0003	<.0001	<.05
		.0003	<.0001	<.05
		.0003	<.0001	<.05

Birchbank Quality Controls
Parameters: Sulphate and pH (lab)

Date	Time	SO4	pH
March 26	1500	9.8	7.90
		9.7	7.88
		9.7	7.90
	2200	8.5	
		9.6	7.88
		9.7	7.86
March 27	100	9.9	7.88
		9.8	7.92
		9.8	7.93
	1300	9.9	7.95
		9.8	7.93
		9.8	7.91
	2100	9.7	7.93
		9.7	7.92
		9.7	7.92
March 28	100	9.7	7.93
		9.7	7.91
		9.7	7.93
	600	9.6	7.83
		9.6	7.90
		9.6	7.90
	1200	9.4	8.00
		9.4	7.98
		9.4	7.98
	1700	9.3	8.02
		9.3	7.99
		9.2	7.93
March 29	200	9.5	7.95
		9.3	7.94
		9.3	7.93
	1000	9.7	8.02
		9.3	8.03
		9.5	8.02
	1800	9.5	8.02
		9.5	8.00
		9.5	8.03

Table 32b

Concentrations (usually mg/L) of metals and other parameters in samples collected at Waneta, March 26 - March 30, 1984.

Station: Waneta
Metal: Cd

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	<.0005			
	1200	<.0005	.0007	<.0005	
			.0005	<.0005	*
			.0008	<.0005	
	1300	.0007			
	1400	<.0005			
	1500	.0013			
	1600	.0011			
	1700	.0009			
	1800	.0014	.0014	.0008	
			.0012	.0010	.68
			.0015	.0010	
	1900	.0006			
	2000	.0006			
	2100	<.0005			
	2200	<.0005			
	2300	<.0005			
	2400	<.0005			
March 27	100	<.0005			
	200	.0012			
	300	.0007	.0005	<.0005	
			.0010	<.0005	*
			.0010	<.0005	
	400	.0012			
	500	.0011			
	600	.0015			
	700	<.0005			
	800	<.0005			
	900	<.0005	.0008	<.0005	
			.0008	<.0005	*
			.0009	<.0005	
	1000	.0005			
	1100	.046			
	1200	.0015			
	1300	.0014			
	1400	.0008			
	1500	.0009	.0010	.0007	
			.0009	.0007	.67
			.0011	.0006	
	1600	.0009			
	1700	.0005			
	1800	.0008	.0006	.0005	
			.0007	<.0005	*
			.0006	.0006	
	1900	.0006			
	2000	.017			
	2100	.0018			
	2200	.0041			

Station: Waneta
Metal: Cd (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 27	2300	<.0005	.0006	.0006	
			.0005	<.0005	*
			.0007	<.0005	
	2400	.0006			
March 28	100	.0019			
	200	.0006			
	300	.0006			
	400	.0008	<.0005	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	500	<.0005			
	900	.0039	.0006	<.0005	
			<.0005	<.0005	*
			<.0005	<.0005	
	1000	.0012			
	1100	.0015			
	1200	.0014			
	1300	.0009			
	1400	.0012			
	1500	.0008	.0008	.0006	
			.0009	.0006	.65
			.0009	.0005	
	1600	.0008			
	1700	.0014			
	1800	.0009			
	1900	.0019			
	2000	.0008	.0008	.0005	
			.0008	.0006	.71
			.0008	.0006	
	2100	.0012			
	2200	.0008			
	2300	.0008	.0008	.0006	
			.0005	.0006	*
			<.0005	.0006	
	2400	.0018			
March 29	100	.0012			
	200	.0016			
	300	.0013			
	400	.0014	.0010	.0007	
			.0007	.0006	.81
			.0009	.0008	
	500	.0009			
	600	.0010			
	700	.0009			
	800	.0010			
	900	<.0005			
	1000	.0012			
	1100	.0010			

Station: Waneta
Metal: Cd (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	1200	.0008	.0005	.0006	
			.0006	.0006	1.18
			.0006	.0008	
	1300	.0009			
	1400	.0009			
	1500	.0009			
	1600	.0010	.0010	.0011	
			.0009	.0010	1.11
			.0009	.0010	
	1700	.0021			
	1800	.0018			
	1900	.0017			
	2000	.0012			
	2100	.0015			
	2200	.0025			
	2300	.0013	.0006	.0007	
			.0005	.0007	1.38
			.0005	.0008	
	2400	.0018			
March 30	100	.0015			
	200	.0012			
	300	.0011			
	400	.0013			
	500	.0013			
	600	.0012			
	700	.0012			
	800	.0011			
	900	.0014			

Station: Waneta
Metal: Cu

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.010			
	1200	.007	.002	.003	
			.002	.004	1.29
			.003	.002	
	1300	.006			
	1400	.006			
	1500	.006			
	1600	.005			
	1700	.005			
	1800	.006	.003	.002	
			.002	.002	1.00
			.004	.005	
	1900	.005			
	2000	.006			
	2100	.003			
	2200	.003			
	2300	.004			
	2400	.004			
March 27	100	.003			
	200	.003			
	300	.002	.002	.001	
			.002	.003	.75
			.008	.005	
	400	.004			
	500	.004			
	600	.004			
	700	.001			
	800	.002			
	900	.002	.002	.002	
			.002	.002	.83
			.002	.001	
	1000	.007			
	1100	.007			
	1200	.017			
	1300	.012			
	1400	.010			
	1500	.010	.004	.003	
			.002	.002	.78
			.003	.002	
	1600	.006			
	1700	.006			
	1800	.007	.001	.001	
			.002	<.001	*
			.002	.002	
	1900	.008			
	2000	.007			
	2100	.007			
	2200	.005			

Station: Waneta
Metal: Cu (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 27	2300	.007	.001	<.001	
			.004	<.001	*
			.002	<.001	
	2400	.004			
March 28	100	.007			
	200	.005			
	300	.007			
	400	.004	.001	.001	
			.001	.001	.75
			.002	.001	
	500	.004			
	900	.005	.002	<.001	
			.002	<.001	*
			.001	<.001	
	1000	.005			
	1100	.005			
	1200	.004			
	1300	.005			
	1400	.005			
	1500	.005	.002	<.001	
			.004	<.001	*
			.001	<.001	
	1600	.005			
	1700	.004			
	1800	.005			
	1900	.003			
	2000	.005	.001	.001	
			.002	.002	.80
			.002	.001	
	2100	.005			
	2200	.004			
	2300	.003	.002	<.001	
			.003	.002	*
			.002	<.001	
	2400	.004			
March 29	100	.003			
	200	.003			
	300	.004			
	400	.003	.004	<.001	
			.003	<.001	*
			.004	<.001	
	500	.004			
	600	.005			
	700	.004			
	800	.004			
	900	.003			
	1000	.003			
	1100	.002			

Station: Waneta
Metal: Cu (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	1200	.004	.003	.002	
			.002	.002	.75
			.003	.002	
	1300	.004			
	1400	.004			
	1500	.004			
	1600	.007	.003	.004	
			.004	.002	.73
			.004	.002	
	1700	.004			
	1800	.004			
	1900	.003			
	2000	.004			
	2100	.004			
	2200	.004			
	2300	.003	.003	.002	
			.003	.001	.91
			.005	.007	
	2400	.003			
March 30	100	.003			
	200	.003			
	300	.002			
	400	.004			
	500	.003			
	600	.003			
	700	.004			
	800	.003			
	900	.005			

Station: Waneta
Metal: Fe

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.07			
	1200	.06	.05	.018	
			.05	.022	.32
			.06	.011	
	1300	.06			
	1400	.06			
	1500	.06			
	1600	.04			
	1700	.06			
	1800	.06	.06	.008	
			.06	.011	.14
			.10	.012	
	1900	.06			
	2000	.08			
	2100	.05			
	2200	.05			
	2300	.07			
	2400	.036			
March 27	100	.046			
	200	.09			
	300	.12	.08	.007	
			.042	.007	.10
			.05	.004	
	400	.07			
	500	.07			
	600	.07			
	700	.05			
	800	.05			
	900	.043	.06	.009	
			.045	.012	.25
			.037	.014	
	1000	.06			
	1100	.08			
	1200	.05			
	1300	.037			
	1400	.05			
	1500	.05	.05	.010	
			.05	.009	.20
			.042	.009	
	1600	.05			
	1700	.05			
	1800	.05	.031	.009	
			.036	.007	.18
			.06	.007	
	1900	.05			
	2000	.06			
	2100	.05			
	2200	.06			

Station: Waneta
Metal: Fe (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 27	2300	.05	.036	.008	
			.06	.006	.16
			.05	.010	
	2400	.05			
March 28	100	.05			
	200	.06			
	300	.08			
	400	.08	.09	.009	
			.06	.007	.12
			.05	.008	
	500	.10			
	900	.08	.08	.007	
			.12	.006	.08
			.06	.007	
	1000	.07			
	1100	.06			
	1200	.05			
	1300	.07			
	1400	.08			
	1500	.06	.06	.008	
			.06	.006	.15
			.07	.014	
	1600	.08			
	1700	.06			
	1800	.07			
	1900	.05			
	2000	.06	.06	.10	
			.06	.012	1.19
			.05	.09	
	2100	.07			
	2200	.06			
	2300	.06	.05	.005	
			.05	.007	.12
			.044	.005	
	2400	.06			
March 29	100	.09			
	200	.05			
	300	.06			
	400	.05	.07	.004	
			.045	.017	.15
			.06	.006	
	500	.07			
	600	.038			
	700	.034			
	800	.05			
	900	.028			
	1000	.044			
	1100	.038			

Station: Waneta
Metal: Fe (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	1200	.038	.038	.004	
			.034	.007	.16
			.035	.006	
	1300	.05			
	1400	.05			
	1500	.047			
	1600	.06	.038	.007	
			.048	.007	.25
			.041	.018	
	1700	.042			
	1800	.042			
	1900	.039			
	2000	.24			
	2100	.08			
	2200	.06			
	2300	.06	.09	.007	
			.042	.005	.13
			.047	.011	
	2400	.06			
March 30	100	.06			
	200	.06			
	300	.06			
	400	.06			
	500	.09			
	600	.07			
	700	.07			
	800	.06			
	900	.18			

Station: Waneta
Metal: Mn

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.01			
	1200	.01	.01	<.01	
			.01	<.01	*
			<.01	<.01	
	1300	.01			
	1400	.01			
	1500	.01			
	1600	.01			
	1700	.01			
	1800	.01	.01	<.01	
			.01	<.01	*
			<.01	<.01	
	1900	.01			
	2000	.01			
	2100	.01			
	2200	.01			
	2300	.01			
	2400	.01			
March 27	100	.01			
	200	.01			
	300	.01	.01	<.01	
			.01	<.01	*
			.01	<.01	
	400	.01			
	500	.01			
	600	.01			
	700	.01			
	800	.01			
	900	.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1000	.01			
	1100	.01			
	1200	.01			
	1300	.01			
	1400	.01			
	1500	.01	.01	<.01	
			.01	<.01	*
			.01	<.01	
	1600	.01			
	1700	.01			
	1800	.01	.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1900	.01			
	2000	.01			
	2100	.01			
	2200	.01			

Station: Waneta
Metal: Mn (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 27	2300	.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	2400	.01			
March 28	100	.01			
	200	.01			
	300	.01			
	400	.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	500	.01			
	900	.01	.01	<.01	
			.01	<.01	*
			.01	<.01	
	1000	.01			
	1100	.01			
	1200	.01			
	1300	.01			
	1400	.01			
	1500	.01	.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	1600	.01			
	1700	.01			
	1800	.01			
	1900	.01			
	2000	.01	<.01	<.01	
			<.01	<.01	*
			<.01	<.01	
	2100	.01			
	2200	.01			
	2300	.01	<.01	<.01	
			.01	<.01	*
			.01	<.01	
	2400	.01			
March 29	100	.01			
	200	.01			
	300	.01			
	400	.01	.01	<.01	
			.01	<.01	*
			.01	<.01	
	500	.01			
	600	.01			
	700	.01			
	800	.01			
	900	.01			
	1000	.01			
	1100	.01			

Station: Waneta
Metal: Mn (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	1200	.01	.01	<.01	
			.01	<.01	*
			.01	<.01	
	1300	.01			
	1400	.01			
	1500	.01			
	1600	.01	.01	<.01	
			.01	<.01	*
			.01	<.01	
	1700	.01			
	1800	.01			
	1900	.01			
	2000	.01			
	2100	.01			
	2200	.01			
	2300	.01	.01	<.01	
			.01	<.01	*
			.01	<.01	
	2400	.01			
March 30	100	.01			
	200	.01			
	300	.01			
	400	.01			
	500	.01			
	600	.01			
	700	.01			
	800	.01			
	900	.01			

Station: Waneta
Metal: Pb

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.001			
	1200	.001	.003	.002	
			.003	.003	.70
			.004	.002	
	1300	<.001			
	1400	.001			
	1500	.007			
	1600	.010			
	1700	.006			
	1800	.012	.006	.002	
			.006	.003	.44
			.006	.003	
	1900	.002			
	2000	.002			
	2100	<.001			
	2200	<.001			
	2300	<.001			
	2400	<.001			
March 27	100	.001			
	200	.005			
	300	.003	.007	.001	
			.003	.002	*
			<.001	.002	
	400	.003			
	500	.003			
	600	.006			
	700	.003			
	800	.004			
	900	.001	.003	.002	
			.003	.002	.78
			.003	.003	
	1000	.002			
	1100	.006			
	1200	.006			
	1300	.007			
	1400	.007			
	1500	.008	.003	.002	
			.003	.001	.44
			.003	.001	
	1600	.003			
	1700	.004			
	1800	.004	.002	<.001	
			.001	<.001	*
			.003	.001	
	1900	.005			
	2000	.005			
	2100	.005			
	2200	.003			

Station: Waneta
Metal: Pb (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 27	2300	.004	.002	.001	
			.004	<.001	*
			.002	<.001	
	2400	.003			
March 28	100	.004			
	200	.003			
	300	.006			
	400	.003	<.001	<.001	
			<.001	<.001	*
			.001	<.001	
	500	.003			
	900	.003	.003	<.001	
			.002	<.001	*
			.002	<.001	
	1000	.003			
	1100	.005			
	1200	.005			
	1300	.005			
	1400	.007			
	1500	.005	.003	<.001	
			.005	.001	*
			.005	.001	
	1600	.007			
	1700	.008			
	1800	.008			
	1900	.004			
	2000	.005	.004	<.001	
			.001	.002	*
			.003	.001	
	2100	.007			
	2200	.003			
	2300	.003	.002	<.001	
			.003	<.001	*
			.003	.001	
	2400	.012			
March 29	100	.010			
	200	.012			
	300	.011			
	400	.006	.006	.002	
			.007	<.001	*
			.007	.002	
	500	.007			
	600	.007			
	700	.004			
	800	.004			
	900	.007			
	1000	.014			
	1100	.010			

Station: Waneta
Metal: Pb (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	1200	.008	.007	.003	
			.008	.003	.38
			.009	.003	
	1300	.011			
	1400	.011			
	1500	.016			
	1600	.017	.020	.007	
			.020	.007	.31
			.021	.005	
	1700	.022			
	1800	.022			
	1900	.018			
	2000	.014			
	2100	.013			
	2200	.016			
	2300	.009	.009	.002	
			.009	.003	.30
			.009	.003	
	2400	.008			
March 30	100	.009			
	200	.010			
	300	.012			
	400	.010			
	500	.008			
	600	.009			
	700	.017			
	800	.007			
	900	.012			

Station: Waneta
Metal: Zn

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 26	1100	.04			
	1200	.03	.02	.03	
			.02	.03	1.29
			.03	.03	
	1300	.03			
	1400	.03			
	1500	.03			
	1600	.03			
	1700	.03			
	1800	.03	.02	.03	
			.03	.03	1.25
			.03	.04	
	1900	.04			
	2000	.04			
	2100	.03			
	2200	.03			
	2300	.02			
	2400	.02			
March 27	100	.02			
	200	.02			
	300	.02	.02	.02	
			.02	.02	1.00
			.03	.03	
	400	.02			
	500	.02			
	600	.02			
	700	.03			
	800	.03			
	900	.02	.019	.02	
			.02	.02	1.02
			.02	.02	
	1000	.03			
	1100	.03			
	1200	.02			
	1300	.02			
	1400	.03			
	1500	.04	.04	.04	
			.04	.03	1.00
			.03	.04	
	1600	.03			
	1700	.03			
	1800	.03	.019	.02	
			.02	.02	1.02
			.02	.02	
	1900	.03			
	2000	.03			
	2100	.03			
	2200	.02			

Station: Waneta
Metal: Zn (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 27	2300	.02	.013	.018	
			.02	.013	.92
			.015	.013	
	2400	.017			
March 28	100	.02			
	200	.02			
	300	.02			
	400	.02	.015	.017	
			.014	.017	1.14
			.015	.016	
	500	.02			
	900	.02	.018	.014	
			.019	.017	.89
			.016	.016	
	1000	.02			
	1100	.02			
	1200	.03			
	1300	.03			
	1400	.06			
	1500	.06	.06	.05	
			.06	.05	.83
			.06	.05	
	1600	.06			
	1700	.05			
	1800	.04			
	1900	.03			
	2000	.03	.05	.03	
			.03	.03	.82
			.03	.03	
	2100	.03			
	2200	.03			
	2300	.03	.03	.02	
			.03	.02	.67
			.03	.02	
	2400	.03			
March 29	100	.03			
	200	.02			
	300	.03			
	400	.02	.03	.02	
			.03	.02	.67
			.03	.02	
	500	.02			
	600	.03			
	700	.03			
	800	.03			
	900	.03			
	1000	.05			
	1100	.06			

Station: Waneta
Metal: Zn (Cont'd)

Date	Time	Auto. Sampler (Manning) Total	Quality Control Total	Quality Control Dissolved	Diss/Total Ratio
March 29	1200	.07	.05	.04	
			.05	.04	.67
			.05	.05	
	1300	.07			
	1400	.07			
	1500	.08			
	1600	.09	.09	.06	
			.09	.06	.67
			.10	.04	
	1700	.10			
	1800	.10			
	1900	.07			
	2000	.05			
	2100	.04			
	2200	.04			
	2300	.03	.03	.03	
			.03	.03	1.00
			.03	.03	
	2400	.03			
March 30	100	.03			
	200	.03			
	300	.03			
	400	.03			
	500	.03			
	600	.03			
	700	.03			
	800	.02			
	900	.04			

Waneta Quality Controls
Extractable Metals (Hg is recorded in ug/l)

Date	Time	As	Se	Hg
March 26	1200	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0001	<.05
	1800	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0001	<.05
March 27	300	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0001	<.05
	900	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0001	<.05
	1500	.0010	.0001	<.05
		.0011	.0002	<.05
		.0010	.0002	<.05
	1800	.0008	.0001	<.05
		.0007	.0002	<.05
		.0008	.0002	<.05
	2300	.0006	.0002	<.05
		.0006	.0001	<.05
		.0006	.0002	<.05
March 28	400	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0001	<.05
	900	.0006	.0001	<.05
		.0006	.0001	<.05
		.0005	.0001	<.05
	1500	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0001	<.05
	2000	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0001	<.05
	2300	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0001	<.05

Waneta Quality Controls
Extractable Metals (Hg is recorded in ug/l)

Date	Time	As	Se	Hg
March 29	400	.0006	.0001	<.05
		.0006	.0001	<.05
		.0006	.0002	<.05
	1200	.0006	.0001	<.05
		.0006	.0001	.06
		.0006	.0001	.06
	1600	.0013	.0002	.05
		.0011	.0002	<.05
		.0012	.0002	<.05
	2300	.0011	.0002	.06
		.0009	.0002	<.05
		.0010	.0002	<.05

Waneta Quality Controls
Parameters: Sulphate and pH (lab)

Date	Time	SO_4	pH
March 26	1200	23.5	7.72
		24.0	7.68
		24.0	7.71
	1800	22.5	7.78
		22.5	7.76
		22.5	7.77
March 27	300	20.0	7.80
		20.5	7.91
		20.5	7.92
	900	20.5	7.85
		20.5	7.87
		20.5	7.84
	1500	14.1	7.78
		14.4	7.80
		14.2	7.80
	1800	13.4	7.90
		13.3	7.83
		13.4	7.83
	2300	14.4	7.83
		14.4	7.83
		14.4	7.83
March 28	400	16.0	7.93
		16.5	7.93
		17.0	7.85
	900	19.4	7.84
		19.4	7.83
		19.4	7.83
	1500	20.5	7.83
		21.0	7.83
		21.0	7.80
	2000	17.9	7.92
		17.8	7.86
		17.6	7.85
	2300	17.2	7.85
		17.2	7.89
		17.2	7.85

Waneta Quality Controls (Cont'd)
Parameters: Sulphate and pH (lab)

March 29	400	20.0	7.85
		20.0	7.83
		20.0	7.85
	1200	22.5	7.92
		23.0	7.96
		23.0	7.92
	1600	23.0	7.90
		23.0	7.90
		23.0	7.85
	2300	20.0	7.98
		20.0	7.93
		20.0	7.93

Table 33

NAQUADAT detailed report of major ions, residues, and physical parameters in samples collected during the March, 1984, 94 - hr survey.

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0001 LAT. 49D 1M 39S LONG. 117D 36M 11S
COLUMBIA RIVER BELOW TRAIL, 1.8 KM NORTH OF WANETA POWER DAM, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	02011R COLOUR APPARENT REL. UNITS	020111 COLOUR APPARENT REL. UNITS	020112 COLOUR APPARENT REL. UNITS	020113 COLOUR APPARENT REL. UNITS	02041R SPECIFIC CONDUCT. USIE/CM	020411 SPECIFIC CONDUCT. USIE/CM	020412 SPECIFIC CONDUCT. USIE/CM	020413 SPECIFIC CONDUCT. USIE/CM
84-03-26	1200	324	L5.	L5.	L5.	L5.	170.7	172.0	170.0	170.0
84-03-28	0900	324	L5.	L5.	L5.	L5.	162.0	160.0	163.0	163.0
84-03-29	1200	324	L5.	L5.	L5.	L5.	165.7	168.0	162.0	167.0

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	02061R TEMP. WATER DEG.C.	020611 TEMP. WATER DEG.C.	020612 TEMP. WATER DEG.C.	020613 TEMP. WATER DEG.C.	02073R TURBIDITY JTU	020731 TURBIDITY JTU	020732 TURBIDITY JTU	020733 TURBIDITY JTU
84-03-26	1200	324	20.6	21.3	20.3	20.1	.62	.60	.60	.67
84-03-28	0900	324	20.7	20.6	20.6	20.9	.51	.57	.47	.49
84-03-29	1200	324	20.7	20.3	21.0	20.7	.46	.43	.47	.48

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	07110R NITROGEN DISSOLVED NO3 & NO2 N MG/L	071101 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071102 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071103 NITROGEN DISSOLVED NO3 & NO2 N MG/L	09106R FLUORIDE DISSOLVED F MG/L	091061 FLUORIDE DISSOLVED F MG/L	091062 FLUORIDE DISSOLVED F MG/L	091063 FLUORIDE DISSOLVED F MG/L
84-03-26	1200	324	.127	.130	.125	.125	.306	.295	.316	.308
84-03-28	0900	324	.126	.127	.126	.126	.197	.191	.198	.203
84-03-29	1200	324	.133	.132	.132	.134	.277	.268	.282	.280

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10101R ALKALINITY TOTAL CACO3 MG/L	101011 ALKALINITY TOTAL CACO3 MG/L	101012 ALKALINITY TOTAL CACO3 MG/L	101013 ALKALINITY TOTAL CACO3 MG/L	10151R ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101511 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101512 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101513 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L
84-03-26	1200	324	59.6	58.9	60.0	59.9	.0	.0	.0	.0
84-03-28	0900	324	61.8	63.3	61.2	61.0	.0	.0	.0	.0
84-03-29	1200	324	57.9	58.4	57.6	57.6	.0	.0	.0	.0

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0001 LAT. 49D 1M 39S LONG. 117D 36M 11S
COLUMBIA RIVER BELOW TRAIL, 1.8 KM NORTH OF WANETA POWER DAM, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10301R PH PH UNITS	103011 PH PH UNITS	103012 PH PH UNITS	103013 PH PH UNITS	10603R HARDNESS TOTAL CACO3 MG/L	106031 HARDNESS TOTAL CACO3 MG/L	106032 HARDNESS TOTAL CACO3 MG/L	106033 HARDNESS TOTAL CACO3 MG/L
84-03-26	1200	324	8.0	7.8	8.0	8.2	85.0	84.3	85.5	85.1
84-03-28	0900	324	8.2	8.4	8.1	8.1	82.0	81.9	82.1	82.1
84-03-29	1200	324	8.2	8.2	8.3	8.2	82.3	82.3	82.3	82.3

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	11103R SODIUM DISSOLVED NA MG/L	111031 SODIUM DISSOLVED NA MG/L	111032 SODIUM DISSOLVED NA MG/L	111033 SODIUM DISSOLVED NA MG/L	12101R MAGNESIUM DISSOLVED (CALCD.) MG MG/L	121011 MAGNESIUM DISSOLVED (CALCD.) MG MG/L	121012 MAGNESIUM DISSOLVED (CALCD.) MG MG/L	121013 MAGNESIUM DISSOLVED (CALCD.) MG MG/L
84-03-26	1200	324	1.8	1.8	1.8	1.8	4.8	4.8	4.8	4.7
84-03-28	0900	324	1.7	1.7	1.7	1.7	4.5	4.6	4.5	4.5
84-03-29	1200	324	1.7	1.7	1.7	1.7	4.5	4.5	4.6	4.5

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	14105R SILICA REACTIVE SIO2 MG/L	141051 SILICA REACTIVE SIO2 MG/L	141052 SILICA REACTIVE SIO2 MG/L	141053 SILICA REACTIVE SIO2 MG/L	16306R SULPHATE DISSOLVED SO4 MG/L	163061 SULPHATE DISSOLVED SO4 MG/L	163062 SULPHATE DISSOLVED SO4 MG/L	163063 SULPHATE DISSOLVED SO4 MG/L
84-03-26	1200	324	5.7	5.7	5.7	5.7	23.8	23.5	24.0	24.0
84-03-28	0900	324	5.2	5.2	5.2	5.2	19.4	19.4	19.4	19.4
84-03-29	1200	324	5.2	5.2	5.2	5.2	22.8	22.5	23.0	23.0

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	17206R CHLORIDE DISSOLVED CL MG/L	172061 CHLORIDE DISSOLVED CL MG/L	172062 CHLORIDE DISSOLVED CL MG/L	172063 CHLORIDE DISSOLVED CL MG/L	19103R POTASSIUM DISSOLVED K MG/L	191031 POTASSIUM DISSOLVED K MG/L	191032 POTASSIUM DISSOLVED K MG/L	191033 POTASSIUM DISSOLVED K MG/L
84-03-26	1200	324	1.0	1.0	1.0	1.0	.6	.7	.6	.6
84-03-28	0900	324	1.0	1.0	1.0	1.0	.6	.6	.6	.6
84-03-29	1200	324	.9	.9	.9	.9	.6	.6	.6	.6

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0001
COLUMBIA RIVER BELOW TRAIL, 1.8 KM NORTH OF WANETA POWER DAM, LAT. 49D 1M 39S LONG. 117D 36M 11S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	20101R CALCIUM DISSOLVED CA MG/L	201011 CALCIUM DISSOLVED CA MG/L	201012 CALCIUM DISSOLVED CA MG/L	201013 CALCIUM DISSOLVED CA MG/L
84-03-26	1200	324	26.2	25.9	26.3	26.3
84-03-28	0900	324	25.3	25.2	25.4	25.4
84-03-29	1200	324	25.4	25.5	25.3	25.5

FOOTNOTE: L - LESS THAN DETECTION LIMIT G - GREATER THAN MEASUREMENT LIMIT
NOTEZ BIEN: L - PLUS PETIT QUE LA LIMITE DE DETECTION G - PLUS GRAND QUE LA LIMITE MESURE

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0005 LAT. 49D 10M 40S LONG. 117D 42M 59S
COLUMBIA RIVER AT BIRCHBANK NEAR TRAIL. WSC STATION NO.08NE049.

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	02011R COLOUR APPARENT REL. UNITS	020111 COLOUR APPARENT REL. UNITS	020112 COLOUR APPARENT REL. UNITS	020113 COLOUR APPARENT REL. UNITS	02041R SPECIFIC CONDUCT. USIE/CM	020411 SPECIFIC CONDUCT. USIE/CM	020412 SPECIFIC CONDUCT. USIE/CM	020413 SPECIFIC CONDUCT. USIE/CM
84-03-26	1500	324	L5.	L5.	L5.	L5.	142.0	143.0	142.0	141.0
84-03-28	1200	324	L5.	L5.	L5.	L5.	142.3	142.0	142.0	143.0
84-03-29	1000	324	L5.	L5.	L5.	L5.	139.3	140.0	141.0	137.0

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	02061R TEMP. WATER DEG.C.	020611 TEMP. WATER DEG.C.	020612 TEMP. WATER DEG.C.	020613 TEMP. WATER DEG.C.	02073R TURBIDITY JTU	020731 TURBIDITY JTU	020732 TURBIDITY JTU	020733 TURBIDITY JTU
84-03-26	1500	324	20.4	20.2	20.4	20.7	.32	.33	.34	.30
84-03-28	1200	324	20.3	20.5	20.2	20.2	.32	.37	.29	.30
84-03-29	1000	324	21.2	21.3	21.0	21.3	.30	.30	.28	.33

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	07110R NITROGEN DISSOLVED NO3 & NO2 N MG/L	071101 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071102 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071103 NITROGEN DISSOLVED NO3 & NO2 N MG/L	09106R FLUORIDE DISSOLVED F MG/L	091061 FLUORIDE DISSOLVED F MG/L	091062 FLUORIDE DISSOLVED F MG/L	091063 FLUORIDE DISSOLVED F MG/L
84-03-26	1500	324	.103	.103	.103	.102	.098	.102	.096	.095
84-03-28	1200	324	.111	.109	.102	.122	.093	.094	.092	.092
84-03-29	1000	324	.115	.111	.111	.122	.095	.100	.093	.091

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10101R ALKALINITY TOTAL CACO3 MG/L	101011 ALKALINITY TOTAL CACO3 MG/L	101012 ALKALINITY TOTAL CACO3 MG/L	101013 ALKALINITY TOTAL CACO3 MG/L	10151R ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101511 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101512 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101513 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L
84-03-26	1500	324	62.2	62.8	62.4	61.5	.0	.0	.0	.0
84-03-28	1200	324	62.4	62.2	62.2	62.8	.0	.0	.0	.0
84-03-29	1000	324	61.8	61.8	61.8	61.9	.0	.0	.0	.0

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0005 LAT. 49D 10M 40S LONG. 117D 42M 59S
COLUMBIA RIVER AT BIRCHBANK NEAR TRAIL. WSC STATION NO.08NE049.

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10301R PH PH UNITS	103011 PH PH UNITS	103012 PH PH UNITS	103013 PH PH UNITS	10603R HARDNESS TOTAL CACO3 MG/L	106031 HARDNESS TOTAL CACO3 MG/L	106032 HARDNESS TOTAL CACO3 MG/L	106033 HARDNESS TOTAL CACO3 MG/L
84-03-26	1500	324	8.3	8.3	8.3	8.2	73.9	73.5	73.3	74.9
84-03-28	1200	324	8.3	8.3	8.3	8.4	72.2	71.9	72.3	72.5
84-03-29	1000	324	8.2	8.1	8.2	8.2	72.6	72.3	72.7	72.7

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	11103R SODIUM DISSOLVED NA MG/L	111031 SODIUM DISSOLVED NA MG/L	111032 SODIUM DISSOLVED NA MG/L	111033 SODIUM DISSOLVED NA MG/L	12101R MAGNESIUM DISSOLVED (CALCD.) MG MG/L	121011 MAGNESIUM DISSOLVED (CALCD.) MG MG/L	121012 MAGNESIUM DISSOLVED (CALCD.) MG MG/L	121013 MAGNESIUM DISSOLVED (CALCD.) MG MG/L
84-03-26	1500	324	1.5	1.5	1.5	1.5	4.7	4.7	4.5	4.9
84-03-28	1200	324	1.5	1.5	1.5	1.5	4.3	4.2	4.4	4.4
84-03-29	1000	324	1.5	1.5	1.5	1.5	4.5	4.5	4.5	4.5

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	14105R SILICA REACTIVE SIO2 MG/L	141051 SILICA REACTIVE SIO2 MG/L	141052 SILICA REACTIVE SIO2 MG/L	141053 SILICA REACTIVE SIO2 MG/L	16306R SULPHATE DISSOLVED SO4 MG/L	163061 SULPHATE DISSOLVED SO4 MG/L	163062 SULPHATE DISSOLVED SO4 MG/L	163063 SULPHATE DISSOLVED SO4 MG/L
84-03-26	1500	324	5.2	5.2	5.2	5.2	9.7	9.8	9.7	9.7
84-03-28	1200	324	5.0	5.0	5.0	5.0	9.6	9.6	9.6	9.6
84-03-29	1000	324	4.8	4.8	4.8	4.8	9.6	9.7	9.5	9.5

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	17206R CHLORIDE DISSOLVED CL MG/L	172061 CHLORIDE DISSOLVED CL MG/L	172062 CHLORIDE DISSOLVED CL MG/L	172063 CHLORIDE DISSOLVED CL MG/L	19103R POTASSIUM DISSOLVED K MG/L	191031 POTASSIUM DISSOLVED K MG/L	191032 POTASSIUM DISSOLVED K MG/L	191033 POTASSIUM DISSOLVED K MG/L
84-03-26	1500	324	.9	.9	.9	.9	.6	.6	.6	.6
84-03-28	1200	324	.9	.9	.9	.9	.6	.6	.6	.6
84-03-29	1000	324	.8	.8	.8	.8	.6	.6	.6	.6

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0005 LAT. 49D 10M 40S LONG. 117D 42M 59S
COLUMBIA RIVER AT BIRCHBANK NEAR TRAIL. WSC STATION NO.08NE049.

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	20101R CALCIUM DISSOLVED CA MG/L	201011 CALCIUM DISSOLVED CA MG/L	201012 CALCIUM DISSOLVED CA MG/L	201013 CALCIUM DISSOLVED CA MG/L
84-03-26	1500	324	21.8	21.7	21.9	21.9
84-03-28	1200	324	21.7	21.8	21.7	21.7
84-03-29	1000	324	21.7	21.6	21.7	21.7

FOOTNOTE: L - LESS THAN DETECTION LIMIT G - GREATER THAN MEASUREMENT LIMIT
NOTEZ BIEN: L - PLUS PETIT QUE LA LIMITE DE DETECTION G - PLUS GRAND QUE LA LIMITE MESURE

Table 34

Water quality parameters measured with the Hydrolab during the March, 1984, acid discharge study. (** indicates measurements taken manually with a parallel analog.)

Date	Time	Depth (meters)	Temp. (deg C)	Conductivity (usie/cm)	pH	Redox (mV)
March 26	1115	1.2	5.1	170	7.33	269
	1130	1.2	5.2	170	7.29	271
	1145	1.3	5.2	170	7.28	275
	1200	1.4	5.3	170	7.28	279
	1215	1.6	5.3	170	7.29	281
	1230	1.6	5.4	170	7.31	284
	1245	1.7	5.4	170	7.34	286
	1300	1.6	5.4	170	7.35	289
	1315	1.5	5.4	170	7.37	290
	1330	1.7	5.4	170	7.39	292
	1345	1.7	5.4	170	7.40	294
	1400	1.7	5.5	170	7.41	296
	1415	1.7	5.5	170	7.42	296
	1430	1.7	5.5	170	7.42	297
	1445	1.6	5.5	170	7.42	298
	1500	1.8	5.5	170	7.42	299
	1515	1.6	5.6	170	7.41	299
	1530	1.7	5.6	170	7.40	300
	1545	1.7	5.6	170	7.39	300
	1600	1.7	5.6	170	7.38	301
	1615	1.7	5.6	170	7.39	301
	1630	1.7	5.5	170	7.38	301
	1645	1.7	5.6	170	7.38	301
	1700	1.8	5.6	170	7.39	301
	1715	1.7	5.5	170	7.39	301
	1730	1.6	5.5	170	7.39	301
	1745	1.6	5.5	170	7.39	300
	1800	1.5	5.5	170	7.39	300
	1815	1.6	5.5	170	7.38	300
	1830	1.6	5.5	170	7.38	301
	1845	1.6	5.5	170	7.38	301
	1900	1.4	5.5	170	7.39	301
	1915	1.5	5.4	170	7.39	301
	1930	1.7	5.4	170	7.40	302
	1945	1.7	5.4	170	7.41	302
	2000	1.6	5.4	170	7.42	303
	2015	1.8	5.4	170	7.42	303
	2030	1.9	5.4	170	7.42	303
	2045	1.9	5.4	170	7.42	303
	2100	1.8	5.3	170	7.42	303
	2115	1.9	5.3	170	7.43	303
	2130	1.9	5.3	170	7.43	303
	2145	1.9	5.3	170	7.43	304

Table 34 (cont'd)

Date	Time	Depth (meters)	Temp. (deg C)	Conductivity (usie/cm)	pH	Redox (mV)
March 26	2200	1.9	5.3	180	7.43	304
	2215	1.9	5.3	170	7.44	304
	2230	1.8	5.3	170	7.44	305
	2245	1.9	5.3	170	7.44	305
	2300	1.8	5.3	170	7.44	305
	2315	1.9	5.3	170	7.44	306
	2330	1.8	5.3	170	7.43	306
	2345	1.7	5.3	170	7.42	306
	2400	1.9	5.3	170	7.41	306
March 27	015	1.8	5.2	170	7.40	305
	030	1.8	5.2	170	7.39	305
	045	1.8	5.2	170	7.39	305
	100	1.8	5.2	170	7.39	306
	115	1.7	5.2	170	7.39	306
	130	1.8	5.2	170	7.39	306
	145	1.8	5.1	170	7.39	307
	200	1.7	5.1	170	7.39	306
	215	1.8	5.1	170	7.39	306
	230	1.8	5.1	170	7.39	306
	245	1.8	5.1	170	7.39	306
	300	1.8	5.0	170	7.40	306
	315	2.0	5.0	170	7.40	305
	330	1.9	5.0	170	7.39	306
	345	1.8	5.0	160	7.39	305
	400	1.8	5.0	170	7.39	306
	415	1.8	5.0	170	7.39	306
	430	1.7	4.9	170	7.39	307
	445	1.9	4.9	170	7.39	307
	500	1.9	4.9	170	7.39	307
	515	1.9	4.9	170	7.38	307
	530	1.9	4.9	170	7.37	307
	545	1.9	4.9	180	7.37	306
	600	2.0	4.8	170	7.36	305
	615	1.8	4.9	170	7.37	306
	630	1.9	4.8	180	7.37	306
	645	1.8	4.8	170	7.37	306
	700	1.9	4.8	170	7.37	305
	715	1.9	4.8	170	7.36	306
	730	1.9	4.8	170	7.36	306
	745	2.0	4.8	170	7.36	305
	800	1.9	4.8	170	7.35	306
	815	1.9	4.7	170	7.35	306
	830	1.9	4.8	170	7.35	306
	845	1.9	4.8	170	7.33	305
	900	1.9	4.8	170	7.32	305
	915	1.9	4.8	170	7.31	305
	** 930	1.7	4.8	160	7.27	305
	** 945	1.7	4.9	160	7.27	305

Table 34 (cont'd)

Date	Time	Depth (meters)	Temp. (deg C)	Conductivity (usie/cm)	pH	Redox (mV)
March 27	**1000	1.7	4.9	160	7.27	306
	**1015	1.7	5.0	160	7.27	306
	**1030	1.7	5.0	160	7.29	307
	**1045	1.7	5.1	160	7.32	308
	1100	1.9	5.1	160	7.40	311
	1115	1.9	5.2	160	7.42	311
	1130	1.8	5.2	150	7.44	312
	1145	1.8	5.2	160	7.45	314
	1200	1.9	5.3	160	7.45	314
	1215	1.9	5.3	150	7.43	316
	1230	2.0	5.3	150	7.39	317
	1245	1.9	5.4	150	7.36	318
	1300	1.8	5.4	150	7.34	319
	1315	1.9	5.4	150	7.32	321
	1330	1.9	5.4	150	7.30	321
	1345	1.8	5.5	150	7.29	322
	1400	1.8	5.5	150	7.28	323
	1415	1.8	5.5	150	7.27	322
	1430	1.8	5.5	150	7.26	322
	1445	1.8	5.5	150	7.25	323
	1500	1.9	5.5	150	7.23	323
	1515	1.8	5.5	150	7.22	324
	1530	1.8	5.6	150	7.21	324
	1545	1.9	5.6	150	7.20	324
	1600	2.0	5.6	150	7.20	324
	1615	1.9	5.6	150	7.20	325
	1630	2.0	5.6	150	7.20	325
	1645	2.0	5.6	150	7.21	326
	1700	2.0	5.6	150	7.22	326
	1715	2.0	5.6	150	7.22	327
	1730	2.0	5.6	150	7.23	327
	1745	1.9	5.5	150	7.25	327
	1800	1.9	5.6	150	7.27	328
	1815	1.9	5.6	150	7.31	327
	1830	1.9	5.6	150	7.34	327
	1845	1.9	5.6	150	7.39	326
	1900	2.0	5.6	150	7.41	326
	1915	2.0	5.6	150	7.44	325
	1930	2.0	5.6	150	7.47	325
	1945	2.0	5.6	150	7.48	324
	2000	1.9	5.6	150	7.48	324
	2015	2.0	5.6	150	7.49	323
	2030	2.0	5.6	150	7.49	323
	2045	2.0	5.6	150	7.49	322
	2100	2.0	5.6	150	7.49	321
	2115	2.0	5.6	160	7.48	320
	2130	2.1	5.6	160	7.48	320
	2145	2.0	5.5	160	7.49	319

Table 34 (cont'd)

Date	Time	Depth (meters)	Temp. (deg C)	Conductivity (usie/cm)	pH	Redox (mV)
March 27	2200	2.0	5.5	160	7.49	319
	2215	2.0	5.6	160	7.49	319
	2230	2.0	5.5	160	7.49	319
	2245	2.0	5.5	160	7.49	319
	2300	2.0	5.5	160	7.49	319
	2315	2.0	5.5	160	7.49	318
	2330	2.0	5.5	150	7.49	318
	2345	2.2	5.4	150	7.49	318
	2400	2.1	5.4	150	7.49	318
March 28	015	2.1	5.4	150	7.49	317
	030	2.1	5.4	150	7.48	317
	045	2.0	5.4	150	7.49	317
	100	2.0	5.3	150	7.49	318
	115	2.0	5.3	150	7.49	318
	130	2.0	5.3	150	7.48	318
	145	2.0	5.2	150	7.47	318
	200	2.0	5.2	150	7.46	318
	215	2.0	5.2	150	7.46	318
	230	2.0	5.2	160	7.45	318
	245	2.0	5.1	160	7.45	318
	300	1.9	5.1	160	7.46	317
	315	2.1	5.1	160	7.46	318
	330	2.0	5.1	160	7.46	319
	345	2.0	5.1	160	7.45	319
	400	2.1	5.0	160	7.45	319
	415	2.0	5.0	160	7.45	319
	430	1.9	5.0	160	7.44	318
	445	2.0	5.0	160	7.44	318
	500	2.0	5.0	160	7.44	318
	515	2.1	5.0	160	7.44	317
	530	2.0	5.0	170	7.43	317
	545	2.1	5.0	170	7.43	317
	600	2.2	4.9	160	7.43	317
	615	2.0	4.9	160	7.43	317
	630	2.0	4.9	160	7.43	317
	645	2.1	4.9	160	7.42	316
	700	2.2	4.9	160	7.42	316
	715	2.1	4.9	160	7.42	315
	730	2.1	4.9	160	7.42	314
	745	2.1	4.9	170	7.42	314
	800	2.1	4.9	160	7.43	315
	815	2.2	4.9	170	7.43	314
	830	2.1	4.9	170	7.43	314
	845	2.1	4.9	170	7.43	314
	900	2.1	4.9	170	7.44	315
	915	2.1	4.9	170	7.44	315
	930	2.2	4.9	160	7.43	315
**	945	1.9	4.9	160	7.40	315

Table 34 (cont'd)

Date	Time	Depth (meters)	Temp. (deg C)	Conductivity (usie/cm)	pH	Redox (mV)
March 28	**1000	1.9	4.9	160	7.41	315
	**1015	1.9	4.9	160	7.42	315
	**1030	1.9	4.9	160	7.43	315
	1045	2.2	5.0	160	7.42	316
	1100	2.1	5.0	160	7.39	317
	1115	2.2	5.0	170	7.36	318
	1130	2.2	5.0	170	7.32	319
	1145	2.2	5.0	170	7.30	319
	1200	2.3	5.0	170	7.27	319
	1215	2.1	5.0	170	7.25	319
	1230	2.0	5.0	170	7.23	319
	1245	2.0	5.0	170	7.22	319
	1300	2.3	5.0	170	7.22	319
	1315	2.1	5.1	170	7.22	319
	1330	2.1	5.1	170	7.23	319
	1345	2.1	5.1	170	7.23	320
	1400	2.0	5.1	170	7.22	320
	1415	2.0	5.1	170	7.22	321
	1430	2.0	5.1	170	7.22	321
	1445	2.0	5.1	170	7.21	322
	1500	2.0	5.1	170	7.22	322
	1515	2.0	5.2	170	7.22	322
	1530	2.0	5.2	170	7.22	322
	1545	2.0	5.2	170	7.22	322
	1600	2.0	5.2	170	7.23	322
	1615	2.0	5.2	170	7.23	323
	1630	2.0	5.2	170	7.23	323
	1645	2.0	5.2	170	7.23	323
	1700	2.0	5.2	170	7.22	323
	1715	2.0	5.2	170	7.22	323
	1730	2.0	5.2	170	7.22	323
	1745	2.0	5.2	170	7.23	324
	1800	2.0	5.3	160	7.25	324
	1815	2.0	5.3	160	7.29	325
	1830	2.1	5.3	160	7.33	327
	1845	2.1	5.3	160	7.37	329
	1900	2.1	5.3	160	7.40	331
	1915	1.9	5.3	160	7.43	332
	1930	2.0	5.3	160	7.46	334
	1945	2.1	5.3	160	7.49	336
	2000	2.1	5.3	160	7.51	338
	2015	2.2	5.2	160	7.52	340
	2030	2.0	5.3	160	7.53	341
	2045	2.0	5.2	160	7.53	341
	2100	1.9	5.2	160	7.52	339
	2115	2.0	5.3	160	7.51	337
	2130	2.0	5.2	160	7.51	335
	2145	2.2	5.2	160	7.51	332

Table 34 (cont'd)

Date	Time	Depth (meters)	Temp. (deg C)	Conductivity (usie/cm)	pH	Redox (mV)
March 28	2200	2.0	5.2	160	7.51	331
	2215	2.0	5.2	160	7.50	329
	2230	2.0	5.2	160	7.50	328
	2245	2.0	5.2	160	7.50	327
	2300	2.0	5.2	160	7.50	326
	**2315	1.8	5.2	160	7.46	324
	**2330	1.8	5.2	160	7.46	323
	**2345	1.8	5.1	160	7.45	321
	**2400	1.8	5.2	160	7.46	320
March 29	015	2.0	5.2	160	7.49	320
	030	2.0	5.1	160	7.48	319
	045	2.1	5.1	160	7.48	319
	100	2.1	5.1	160	7.47	318
	115	2.0	5.1	160	7.47	318
	130	2.1	5.1	160	7.46	318
	145	2.0	5.1	160	7.46	318
	200	2.1	5.1	160	7.45	317
	215	2.0	5.1	160	7.45	317
	230	2.0	5.1	160	7.44	317
	245	1.9	5.1	160	7.44	316
	300	2.0	5.1	160	7.44	316
	315	2.0	5.0	160	7.44	316
	330	1.9	5.0	160	7.45	316
	345	2.0	5.0	160	7.45	316
	400	2.1	5.0	170	7.44	315
	415	2.0	5.0	170	7.43	315
	430	2.0	5.0	170	7.43	314
	445	1.9	5.0	170	7.42	314
	500	2.0	5.0	170	7.41	314
	51[illegible]	2.0	5.0	170	7.40	314
	530	2.0	5.0	170	7.40	313
	545	2.0	4.9	170	7.40	312
	600	2.0	5.0	170	7.40	312
	615	2.1	4.9	170	7.39	311
	630	2.1	4.9	170	7.40	311
	645	2.1	4.9	170	7.40	311
	700	2.1	4.9	170	7.41	312
	715	2.1	4.9	170	7.42	312
	730	2.1	4.9	170	7.42	313
	745	2.2	4.9	170	7.43	313
	800	2.1	4.9	170	7.43	314
	815	2.1	4.9	170	7.43	313
	830	2.2	4.9	170	7.44	313
	845	2.0	4.9	170	7.44	312
	900	2.1	4.9	170	7.45	312
	915	2.2	4.9	170	7.44	311
	930	2.2	5.0	160	7.42	312
	945	2.2	5.0	160	7.37	312

Table 34 (cont'd)

Date	Time	Depth (meters)	Temp. (deg C)	Conductivity (usie/cm)	pH	Redox (mV)
March 29	1000	2.2	5.1	170	7.32	312
	1015	2.2	5.1	170	7.29	313
	1030	2.2	5.1	170	7.26	314
	1045	2.2	5.2	170	7.23	314
	1100	2.2	5.2	170	7.21	315
	1115	2.2	5.2	170	7.20	316
	1130	2.2	5.3	170	7.18	317
	1145	2.1	5.3	170	7.17	318
	1200	2.2	5.4	170	7.16	319
	1215	2.2	5.4	170	7.16	320
	1230	2.2	5.4	170	7.16	320
	1245	2.1	5.4	170	7.16	321
	1300	2.2	5.5	170	7.15	322
	1315	2.1	5.5	170	7.14	322
	1330	2.1	5.5	170	7.13	323
	1345	2.1	5.6	170	7.13	323
	1400	2.0	5.6	170	7.13	325
	1415	2.1	5.6	170	7.13	325
	1430	2.1	5.6	170	7.12	325
	1445	2.1	5.6	170	7.12	326
	1500	2.0	5.6	170	7.11	326
	1515	1.9	5.6	170	7.11	327
	1530	2.1	5.7	170	7.10	327
	1545	2.1	5.7	170	7.10	327
	1600	2.1	5.7	170	7.11	327
	1615	1.9	5.6	170	7.12	328
	1630	2.0	5.6	170	7.13	329
	1645	2.1	5.6	170	7.14	330
	1700	2.1	5.6	170	7.14	330
	1715	2.1	5.6	170	7.14	330
	1730	2.1	5.6	170	7.14	330
	1745	2.2	5.6	170	7.15	329
	1800	2.1	5.6	170	7.16	328
	1815	2.0	5.6	170	7.18	326
	1830	2.0	5.6	170	7.21	325
	1845	2.1	5.6	170	7.24	323
	1900	2.0	5.6	170	7.27	322
	1915	2.1	5.6	170	7.30	320
	1930	2.1	5.6	170	7.32	318
	1945	2.1	5.6	170	7.34	316
	2000	2.1	5.6	170	7.36	315
	2015	2.1	5.6	170	7.37	313
	2030	2.1	5.6	170	7.38	311
	2045	2.1	5.6	170	7.39	311
	2100	2.1	5.6	170	7.39	309
	2115	1.9	5.6	170	7.39	309
	2130	1.9	5.6	170	7.39	308
	2145	2.1	5.6	170	7.40	307

Table 34 (cont'd)

Date	Time	Depth (meters)	Temp. (deg C)	Conductivity (usie/cm)	pH	Redox (mV)
March 29	2200	2.0	5.5	170	7.40	306
	2215	2.0	5.5	160	7.40	306
	2230	2.0	5.5	160	7.40	305
	2245	2.1	5.5	160	7.40	305
	2300	2.1	5.5	160	7.40	305
	2315	2.1	5.5	160	7.40	304
	2330	2.1	5.5	170	7.40	304
	2345	2.1	5.5	170	7.40	304
	2400	2.0	5.4	170	7.39	303
March 30	015	2.0	5.4	170	7.39	303
	030	2.1	5.5	170	7.40	303
	045	2.1	5.4	170	7.39	303
	100	2.1	5.4	170	7.39	303
	115	2.0	5.4	170	7.40	302
	130	2.1	5.4	170	7.40	303
	145	2.1	5.3	170	7.40	303
	200	2.0	5.3	170	7.40	302
	215	1.9	5.3	170	7.39	302
	230	2.0	5.3	170	7.39	301
	245	2.0	5.2	170	7.38	301
	300	2.0	5.2	170	7.38	301
	315	2.0	5.2	160	7.38	300
	330	2.0	5.2	160	7.38	300
	345	2.1	5.2	170	7.37	300
	400	2.1	5.2	170	7.38	300
	415	2.1	5.1	170	7.38	300
	430	2.1	5.1	170	7.38	300
	445	2.1	5.1	170	7.38	300
	500	2.1	5.1	170	7.38	300
	515	2.1	5.1	170	7.38	300
	530	2.1	5.0	160	7.37	300
	545	2.1	5.0	160	7.37	300
	600	2.1	5.0	160	7.37	300
	615	2.1	5.0	160	7.37	299
	630	2.0	4.9	160	7.36	298
	645	2.3	4.9	160	7.36	298
	700	2.1	4.9	160	7.36	297
	715	2.1	4.9	160	7.36	297
	730	2.1	4.9	160	7.36	297
	745	2.2	4.9	160	7.36	297
	800	2.1	4.9	160	7.37	297

Table 35

Concentrations (usually mg/L) of metals and other parameters measured at five points on the cross section at Waneta during the March, 1984, intensive study.

Waneta Cross Section
Metal: As

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	.0008	.0008	.0008	.0008	.0009
(1500-1600)	.0009	.0008	.0008	.0009	.0008
	.0008	.0007	.0008	.0008	.0008
Mean	.0008	.0008	.0008	.0008	.0008
S. D.	.0001	.0001	0	.0001	.0001
March 29	.0010	.0010	.0010	.0012	.0010
(1345-1356)	.0010	.0010	.0010	.0011	.0009
	.0011	.0011	.0011	.0012	.0011
Mean	.0010	.0010	.0010	.0012	.0010
S. D.	.0001	.0001	.0001	.0001	.0001

Waneta Cross Section
Metal: Cd

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	<.0005	.0006	.0005	<.0005	<.0005
(1500-1600)	<.0005	.0008	.0009	.0009	.0008
	.0007	.0007	.0008	<.0005	.0006
Mean	*	.0007	.0007	*	*
S. D.	*	.0001	.0002	*	*
March 29	.0010	.0012	.0009	.0010	.0011
(1345-1356)	.0009	.0011	.0009	.0009	.0012
	.0008	.0011	.0009	.0008	.0012
Mean	.0009	.0011	.0009	.0009	.0012
S. D.	.0001	.0001	0	.0001	.0001

Waneta Cross Section
Metal: Cu

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	.004	.005	.006	.004	.004
(1500-1600)	.004	.005	.006	.003	.005
	.004	.005	.005	.004	.005
Mean	.004	.005	.006	.004	.005
S. D.	0	0	.001	.001	.001
March 29	.004	.005	.003	.007	.005
(1345-1356)	.003	.004	.004	.005	.006
	.003	.003	.005	.007	.005
Mean	.003	.004	.004	.006	.005
S. D.	.001	.001	.001	.001	.001

Waneta Cross Section
Metal: Hg (ug/l)

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	<.05	<.05	<.05	<.05	<.05
(1500-1600)	<.05	<.05	<.05	<.05	<.05
	<.05	<.05	<.05	<.05	<.05
Mean	*	*	*	*	*
S. D.	*	*	*	*	*
March 29	<.05	<.05	<.05	.07	<.05
(1345-1356)	<.05	<.05	<.05	.07	<.05
	<.05	<.05	<.05	.07	<.05
Mean	*	*	*	.07	*
S. D.	*	*	*	0	*

Waneta Cross Section
Metal: Fe

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	.05	.044	.05	.45	.07
(1500-1600)	.06	.07	.05	.10	.09
	.07	.07	.07	.048	.07
Mean	.06	.06	.06	.20	.08
S. D.	.01	.02	.01	.22	.01
March 29	.05	.07	.06	.07	.05
(1345-1356)	.043	.06	.06	.07	.05
	.047	.046	.05	.07	.05
Mean	.05	.06	.06	.07	.05
S. D.	.00	.01	.01	0	0

Waneta Cross Section
Metal: Mn

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	.01	.01	.01	.02	.01
(1500-1600)	.01	.01	.01	.01	.01
	.01	.01	.01	.01	.01
Mean	.01	.01	.01	.01	.01
S. D.	0	0	0	.01	0
March 29	.01	.01	.01	.01	.01
(1345-1356)	.01	.01	.01	.01	.01
	.01	.01	.01	.01	.01
Mean	.01	.01	.01	.01	.01
S. D.	0	0	0	0	0

Waneta Cross Section
Metal: Pb

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	.004	.007	.007	.007	.005
(1500-1600)	.005	.007	.008	.006	.007
	.005	.006	.008	.004	.007
Mean	.005	.007	.008	.006	.006
S. D.	.001	.001	.001	.002	.001
March 29	.015	.015	.012	.017	.013
(1345-1356)	.013	.017	.014	.017	.015
	.012	.014	.016	.016	.013
Mean	.013	.015	.014	.017	.014
S. D.	.002	.002	.002	.001	.001

Waneta Cross Section
Metal: Se

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	.0001	.0001	.0001	.0001	.0002
(1500-1600)	<.0001	.0002	.0001	.0001	.0001
	.0002	.0001	.0001	.0001	.0001
Mean	*	.0001	.0001	.0001	.0001
S. D.	*	.0001	0	0	.0001
March 29	.0001	.0001	.0001	.0001	.0001
(1345-1356)	.0001	.0001	.0001	.0001	.0001
	.0001	.0001	.0001	.0001	.0001
Mean	.0001	.0001	.0001	.0001	.0001
S. D.	0	0	0	0	0

Waneta Cross Section
Metal: Zn

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 2/	.04	.04	.04	.04	.04
(1550-1600)	.04	.05	.05	.05	.04
	.04	.05	.05	.04	.04
Mean	.04	.05	.05	.04	.04
S. D.	0	.01	.01	.01	0
March 29	.07	.08	.08	.08	.08
(1345-1356)	.07	.09	.08	.08	.07
	.07	.08	.08	.08	.09
Mean	.07	.08	.08	.08	.08
S. D.	0	.01	0	0	.01

Waneta Cross Section
Parameter: pH

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27 (1500-1600)	7.88	7.85	7.82	7.90	7.88
	7.88	7.80	7.80	7.85	7.83
	7.90	7.80	7.82	7.84	7.82
Mean	7.89	7.82	7.81	7.86	7.84
S. D.	.012	.029	.012	.032	.032
March 29 (1345-1356)	7.85	7.86	7.85	7.83	7.88
	7.82	7.90	7.87	7.85	7.90
	7.82	7.88	7.84	7.90	7.90
Mean	7.83	7.88	7.85	7.86	7.89
S. D.	.017	.020	.015	.036	.012

Waneta Cross Section
Parameter: SO_4

	Meters from Left Bank				
Date and Time	33	66	99	132	165
March 27	14.9	14.7	14.7	14.9	14.9
(1500-1600)	14.7	14.7	14.9	15.1	15.2
	14.7	14.7	15.1	15.1	15.2
Mean	14.8	14.7	14.9	15.0	15.1
S. D.	.12	0	.2	.12	.17
March 29	22.5	22.5	23.0	23.0	23.0
(1345-1356)	23.0	22.5	23.0	23.0	23.0
	23.0	22.5	23.0	23.0	23.0
Mean	22.8	22.5	23.0	23.0	23.0
S. D.	.29	0	0	0	0

Section 4

Other Stations

OTHER STATIONS

To provide information on background conditions affecting water quality at the border, samples were collected from the Columbia River at Birchbank and from the Pend d'Oreille River.

Most of the sampling undertaken at Birchbank was done as part of the intensive time series studies which have already been described. Additional samples were collected at Birchbank on July 26, 1978, to substantiate the assumption that concentrations of nutrients and metals were lower upstream from Trail.

Ten replicate samples were taken for determination of nutrients and metals concentrations. A sample for analyses for major ions, residues, and physical parameters was also collected. These samples were collected by hand-dipping bottles at a wadeable distance from the right bank of the river.

Detailed sampling was undertaken on the Pend d'Oreille just upstream from its confluence with the Columbia. It was necessary to know concentrations of nutrients and metals in the Pend d'Oreille in order to calculate concentrations and loads of these substances crossing the International Border. Further, it was necessary to establish whether the Pend d'Oreille was itself a source of metals, as mining activity had taken place in the watershed, and an inactive lead-zinc mine with a tailings pond remained in the Pend d'Oreille Valley.

Each time that samples were collected on the cross section at Waneta (June, 1978 - July, 1979), samples were also taken from the Pend d'Oreille River. Ten replicates for nutrients and metals analyses plus an additional sample for other parameters were collected. In addition, during the March, 1984, 94-hour study, one set of 3 replicate samples was collected from the Pend d'Oreille.

The field sampling procedure on the Pend d'Oreille River was identical to that described for Birchbank.

Table 36

NAQUADAT detailed report of water quality parameters measured in replicate samples collected from the Columbia River at Birchbank on July, 26, 1978.

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0005
COLUMBIA RIVER AT BIRCHBANK NEAR TRAIL. WSC STATION NO.08NE049. LAT. 49D 10M 40S LONG. 117D 42M 59S

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	02011L COLOUR APPARENT REL. UNITS	02041L SPECIFIC CONDUCT. USIE/CM	02061L TEMP. WATER DEG.C.	02073L TURBIDITY JTU	06606R CYANIDE CN MG/L	066061 CYANIDE CN MG/L	066062 CYANIDE CN MG/L	066063 CYANIDE CN MG/L
78-07-26	1200	324	5.	115.0	19.8	.52	.001	.001	.001	.001

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	07110R NITROGEN DISSOLVED NO3 & NO2 N MG/L	071101 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071102 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071103 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071104 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071105 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071106 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071107 NITROGEN DISSOLVED NO3 & NO2 N MG/L
78-07-26	1200	324	.047	.046	.047	.047	.048	.049	.048	.048

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	071108 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071109 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071100 NITROGEN DISSOLVED NO3 & NO2 N MG/L	07557R NITROGEN DISSOLVED AMMONIA N MG/L	075571 NITROGEN DISSOLVED AMMONIA N MG/L	075572 NITROGEN DISSOLVED AMMONIA N MG/L	075573 NITROGEN DISSOLVED AMMONIA N MG/L	075574 NITROGEN DISSOLVED AMMONIA N MG/L
78-07-26	1200	324	.047	.047	.047	Q.002	L.002	.002	L.002	.003

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	075575 NITROGEN DISSOLVED AMMONIA N MG/L	075576 NITROGEN DISSOLVED AMMONIA N MG/L	075577 NITROGEN DISSOLVED AMMONIA N MG/L	075578 NITROGEN DISSOLVED AMMONIA N MG/L	075579 NITROGEN DISSOLVED AMMONIA N MG/L	075570 NITROGEN DISSOLVED AMMONIA N MG/L	07651R NITROGEN DISSOLVED N MG/L	076511 NITROGEN DISSOLVED N MG/L
78-07-26	1200	324	.005	.002	.002	.002	L.002	.002	.12	.12

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0005
COLUMBIA RIVER AT BIRCHBANK NEAR TRAIL. WSC STATION NO.08NE049. LAT. 49D 10M 40S LONG. 117D 42M 59S

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	076512 NITROGEN DISSOLVED N MG/L	076513 NITROGEN DISSOLVED N MG/L	076514 NITROGEN DISSOLVED N MG/L	076515 NITROGEN DISSOLVED N MG/L	076516 NITROGEN DISSOLVED N MG/L	076517 NITROGEN DISSOLVED N MG/L	076518 NITROGEN DISSOLVED N MG/L	076519 NITROGEN DISSOLVED N MG/L
78-07-26	1200	324	.13	.13	.12	.13	.13	.12	.12	.12

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	076510 NITROGEN DISSOLVED N MG/L	09106L FLUORIDE DISSOLVED F MG/L	10101L ALKALINITY TOTAL CACO3 MG/L	10151L ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	10301L PH PH UNITS	10401L RESIDUE NONFILTR. MG/L	10451L RESIDUE FILTERABLE MG/L	10501L RESIDUE FIXED NONFILTR. MG/L
78-07-26	1200	324	.12	.095	48.5	.0	7.9	2.	70.	L1.

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10551L RESIDUE FIXED FILTERABLE MG/L	10603L HARDNESS TOTAL CACO3 MG/L	11103L SODIUM DISSOLVED NA MG/L	12101L MAGNESIUM DISSOLVED (CALCD.) MG MG/L	14105L SILICA REACTIVE SIO2 MG/L	15102R PHOSPHORUS TOTAL DISSOLVED P MG/L	151021 PHOSPHORUS TOTAL DISSOLVED P MG/L	151022 PHOSPHORUS TOTAL DISSOLVED P MG/L
78-07-26	1200	324	41.	54.7	1.4	3.2	4.0	.002	.003	.002

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	151023 PHOSPHORUS TOTAL DISSOLVED P MG/L	151024 PHOSPHORUS TOTAL DISSOLVED P MG/L	151025 PHOSPHORUS TOTAL DISSOLVED P MG/L	151026 PHOSPHORUS TOTAL DISSOLVED P MG/L	151027 PHOSPHORUS TOTAL DISSOLVED P MG/L	151028 PHOSPHORUS TOTAL DISSOLVED P MG/L	151029 PHOSPHORUS TOTAL DISSOLVED P MG/L	151020 PHOSPHORUS TOTAL DISSOLVED P MG/L
78-07-26	1200	324	.002	.001	.002	.002	.003	.002	.002	.002

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0005
COLUMBIA RIVER AT BIRCHBANK NEAR TRAIL. WSC STATION NO.08NE049. LAT. 49D 10M 40S LONG. 117D 42M 59S

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	15406R PHOSPHORUS TOTAL P MG/L	154061 PHOSPHORUS TOTAL P MG/L	154062 PHOSPHORUS TOTAL P MG/L	154063 PHOSPHORUS TOTAL P MG/L	154064 PHOSPHORUS TOTAL P MG/L	154065 PHOSPHORUS TOTAL P MG/L	154066 PHOSPHORUS TOTAL P MG/L	154067 PHOSPHORUS TOTAL P MG/L
78-07-26	1200	324	.009	.008	.009	.010	.008	.008	.010	.008

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	154068 PHOSPHORUS TOTAL P MG/L	154069 PHOSPHORUS TOTAL P MG/L	154060 PHOSPHORUS TOTAL P MG/L	16306L SULPHATE DISSOLVED SO4 MG/L	17206L CHLORIDE DISSOLVED CL MG/L	19103L POTASSIUM DISSOLVED K MG/L	20101L CALCIUM DISSOLVED CA MG/L	25004R MANGANESE TOTAL MN MG/L
78-07-26	1200	324	.008	.010	.009	8.8	.8	.6	16.7	L.01

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	250041 MANGANESE TOTAL MN MG/L	250042 MANGANESE TOTAL MN MG/L	250043 MANGANESE TOTAL MN MG/L	250044 MANGANESE TOTAL MN MG/L	250045 MANGANESE TOTAL MN MG/L	250046 MANGANESE TOTAL MN MG/L	250047 MANGANESE TOTAL MN MG/L	250048 MANGANESE TOTAL MN MG/L
78-07-26	1200	324	L.01	L.01	L.01	L.01	L.01	L.01	L.01	L.01

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	250049 MANGANESE TOTAL MN MG/L	250040 MANGANESE TOTAL MN MG/L	26004R IRON TOTAL FE MG/L	260041 IRON TOTAL FE MG/L	260042 IRON TOTAL FE MG/L	260043 IRON TOTAL FE MG/L	260044 IRON TOTAL FE MG/L	260045 IRON TOTAL FE MG/L
78-07-26	1200	324	L.01	L.01	.09	.09	.11	.09	.09	.10

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0005
COLUMBIA RIVER AT BIRCHBANK NEAR TRAIL. WSC STATION NO.08NE049. LAT. 49D 10M 40S LONG. 117D 42M 59S

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	260046 IRON TOTAL FE MG/L	260047 IRON TOTAL FE MG/L	260048 IRON TOTAL FE MG/L	260049 IRON TOTAL FE MG/L	260040 IRON TOTAL FE MG/L	28002R NICKEL TOTAL NI MG/L	280021 NICKEL TOTAL NI MG/L	280022 NICKEL TOTAL NI MG/L
78-07-26	1200	324	.09	.07	.07	.08	.08	.002	.002	.001

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	280023 NICKEL TOTAL NI MG/L	280024 NICKEL TOTAL NI MG/L	280026 NICKEL TOTAL NI MG/L	280027 NICKEL TOTAL NI MG/L	280028 NICKEL TOTAL NI MG/L	280029 NICKEL TOTAL NI MG/L	280020 NICKEL TOTAL NI MG/L	29005R COPPER TOTAL CU MG/L
78-07-26	1200	324	.001	.001	.001	.003	.003	.002	.005	.003

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	290051 COPPER TOTAL CU MG/L	290052 COPPER TOTAL CU MG/L	290053 COPPER TOTAL CU MG/L	290054 COPPER TOTAL CU MG/L	290055 COPPER TOTAL CU MG/L	290056 COPPER TOTAL CU MG/L	290057 COPPER TOTAL CU MG/L	290058 COPPER TOTAL CU MG/L
78-07-26	1200	324	.002	.002	.003	.002	007	.002	.002	.004

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	290059 COPPER TOTAL CU MG/L	290050 COPPER TOTAL CU MG/L	30005R ZINC TOTAL ZN MG/L	300051 ZINC TOTAL ZN MG/L	300052 ZINC TOTAL ZN MG/L	300053 ZINC TOTAL ZN MG/L	300054 ZINC TOTAL ZN MG/L	300056 ZINC TOTAL ZN MG/L
78-07-26	1200	324	.004	.001	.006	.006	.006	.005	.005	.003

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0005
COLUMBIA RIVER AT BIRCHBANK NEAR TRAIL. WSC STATION NO.08NE049. LAT. 49D 10M 40S LONG. 117D 42M 59S

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	300057 ZINC TOTAL ZN MG/L	300058 ZINC TOTAL ZN MG/L	300059 ZINC TOTAL ZN MG/L	300050 ZINC TOTAL ZN MG/L	82002R LEAD TOTAL PB MG/L	820021 LEAD TOTAL PB MG/L	820022 LEAD TOTAL PB MG/L	820023 LEAD TOTAL PB MG/L
78-07-26	1200	324	.007	.008	.005	.006	.004	.008	.004	.004

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	820024 LEAD TOTAL PB MG/L	820025 LEAD TOTAL PB MG/L	820026 LEAD TOTAL PB MG/L	820027 LEAD TOTAL PB MG/L	820028 LEAD TOTAL PB MG/L	820029 LEAD TOTAL PB MG/L	820020 LEAD TOTAL PB MG/L
78-07-26	1200	324	.004	.001	.003	.004	.002	.002	.005

FOOTNOTE: L - LESS THAN DETECTION LIMIT G - GREATER THAN MEASUREMENT LIMIT
NOTEZ BIEN: L - PLUS PETIT QUE LA LIMITE DE DETECTION G - PLUS GRAND QUE LA LIMITE MESURE

Table 37

NAQUADAT detailed report of water quality parameters measured in replicate samples collected from the Pend d'Oreille River June, 1978 - March, 1984.

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029 LAT. 49D 0M 11S LONG. 117D 37M 0S
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	02011L COLOUR APPARENT REL. UNITS	020111 COLOUR APPARENT REL. UNITS	020112 COLOUR APPARENT REL. UNITS	020113 COLOUR APPARENT REL. UNITS	02041S SPECIFIC CONDUCT. USIE/CM	02041L SPECIFIC CONDUCT. USIE/CM	020411 SPECIFIC CONDUCT. USIE/CM	020412 SPECIFIC CONDUCT. USIE/CM
78-06-02	1200	324	5.	--	--	--	--	139.	--	--
78-07-26	1200	324	5.	--	--	--	--	144.	--	--
78-11-15	1000	324	5.	--	--	--	--	170.	--	--
79-05-02	1100	324	7. 11R	5.	10.	5.	145.	145. 41R	146.	145.
79-06-05	1345	324	5. 11R	5.	5.	5.	105.	137. 41R	137.	137.
79-07-04	0945	324	5. 11R	5.	5.	5.	--	154. 41R	152.	156.
84-03-29	1300	324	5. 11R	5.	5.	5.	--	140. 41R	141.	140.

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	020413 SPECIFIC CONDUCT. USIE/CM	02061S TEMP. WATER DEG.C.	02061L TEMP. WATER DEG.C.	020611 TEMP. WATER DEG.C.	020612 TEMP. WATER DEG.C.	020613 TEMP. WATER DEG.C.	02073L TURBIDITY JTU	020731 TURBIDITY JTU
78-06-02	1200	324	--	--	21.2	--	--	--	.2	--
78-07-26	1200	324	--	--	19.9	--	--	--	1.2	--
78-11-15	1000	324	--	--	21.0	--	--	--	1.3	--
79-05-02	1100	324	145.	10.7	20.1 61R	20.0	20.3	20.1	2.3 73R	2.1
79-06-05	1345	324	137.	16.0	18.8 61R	18.7	18.8	18.9	2.2 73R	2.6
79-07-04	0945	324	155.	--	24.2 61R	20.0	26.5	26.0	2.4 73R	1.4
84-03-29	1300	324	140.	--	21.9 61R	21.9	21.8	21.9	3.0 73R	2.6

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	020732 TURBIDITY JTU	020733 TURBIDITY JTU	06001R CARBON TOTAL ORGANIC C MG/L	060011 CARBON TOTAL ORGANIC C MG/L	060012 CARBON TOTAL ORGANIC C MG/L	060013 CARBON TOTAL ORGANIC C MG/L	060014 CARBON TOTAL ORGANIC C MG/L	060015 CARBON TOTAL ORGANIC C MG/L
78-06-02	1200	324	--	--	9.5	10.0	9.6	9.9	9.6	8.6
79-05-02	1100	324	2.2	2.6	--	--	--	--	--	--
79-06-05	1345	324	1.7	2.2	--	--	--	--	--	--
79-07-04	0945	324	1.5	4.4	--	--	--	--	--	--
84-03-29	1300	324	2.9	3.4	--	--	--	--	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	060016 CARBON TOTAL ORGANIC C MG/L	06051R CARBON TOTAL INORGANIC C MG/L	060511 CARBON TOTAL INORGANIC C MG/L	060512 CARBON TOTAL INORGANIC C MG/L	060513 CARBON TOTAL INORGANIC C MG/L	060514 CARBON TOTAL INORGANIC C MG/L	060515 CARBON TOTAL INORGANIC C MG/L	060516 CARBON TOTAL INORGANIC C MG/L
78-06-02	1200	324	9.2	11.2	10.0	11.0	11.0	11.0	12.0	12.0

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	06606R CYANIDE CN MG/L	066061 CYANIDE CN MG/L	066062 CYANIDE CN MG/L	066063 CYANIDE CN MG/L	07110R NITROGEN DISSOLVED NO3 & NO2 N MG/L	071101 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071102 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071103 NITROGEN DISSOLVED NO3 & NO2 N MG/L
78-06-02	1200	324	--	--	--	--	Q.002	L.002	.002	L.002
78-07-26	1200	324	.001	.0006	.0006	.0005	.012	.012	.012	.011
78-11-15	1000	324	--	--	--	--	Q.002	.003	.002	.002
79-05-02	1100	324	--	--	--	--	.019	.019	.019	.019
79-06-05	1345	324	--	--	--	--	L.002	L.002	L.002	L.002
79-07-04	0945	324	--	--	--	--	.003	.003	.003	.005
84-03-29	1300	324	--	--	--	--	.023	.023	.022	.023

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	071104 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071105 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071106 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071107 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071108 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071109 NITROGEN DISSOLVED NO3 & NO2 N MG/L	071100 NITROGEN DISSOLVED NO3 & NO2 N MG/L	07557R NITROGEN DISSOLVED AMMONIA N MG/L
78-06-02	1200	324	L.002	L.002	L.002	--	--	--	--	Q.002
78-07-26	1200	324	.010	.016	.010	.011	.010	.015	.015	Q.005
78-11-15	1000	324	.003	.002	.002	.002	L.002	L.002	L.002	.004
79-05-02	1100	324	.019	.019	.019	.020	.019	.019	.019	.006
79-06-05	1345	324	L.002	L.002	L.002	L.002	L.002	L.002	L.002	.012
79-07-04	0945	324	.004	.004	.003	.003	.002	.002	.003	.012

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	075571 NITROGEN DISSOLVED AMMONIA N MG/L	075572 NITROGEN DISSOLVED AMMONIA N MG/L	075573 NITROGEN DISSOLVED AMMONIA N MG/L	075574 NITROGEN DISSOLVED AMMONIA N MG/L	075575 NITROGEN DISSOLVED AMMONIA N MG/L	075576 NITROGEN DISSOLVED AMMONIA N MG/L	075577 NITROGEN DISSOLVED AMMONIA N MG/L	075578 NITROGEN DISSOLVED AMMONIA N MG/L
78-06-02	1200	324	.003	.002	L.002	.003	.002	.002	--	--
78-07-26	1200	324	L.002	.005	L.002	.002	.008	.003	.006	.005
78-11-15	1000	324	.006	.004	.003	.003	.003	.008	.003	.004
79-05-02	1100	324	.006	.006	.006	.006	.005	.007	.008	.006
79-06-05	1345	324	.010	.013	.017	.012	.013	.011	.009	.011
79-07-04	0945	324	.010	.009	.011	.015	.014	.012	.014	.011

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	075579 NITROGEN DISSOLVED AMMONIA N MG/L	075570 NITROGEN DISSOLVED AMMONIA N MG/L	07651R NITROGEN DISSOLVED N MG/L	076511 NITROGEN DISSOLVED N MG/L	076512 NITROGEN DISSOLVED N MG/L	076513 NITROGEN DISSOLVED N MG/L	076514 NITROGEN DISSOLVED N MG/L	076515 NITROGEN DISSOLVED N MG/L
78-06-02	1200	324	--	--	.085	.085	.087	.084	.082	.084
78-07-26	1200	324	.009	.008	.101	.100	.100	.110	.100	.100
78-11-15	1000	324	.003	.003	.074	.076	.072	.076	.074	.075
79-05-02	1100	324	.006	.008	.105	.100	.100	.100	.100	.100
79-06-05	1345	324	.012	.012	.082	.076	.081	.087	.081	.091
79-07-04	0945	324	.013	.011	.095	.096	.091	.101	.101	.091

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	076516 NITROGEN DISSOLVED N MG/L	076517 NITROGEN DISSOLVED N MG/L	076518 NITROGEN DISSOLVED N MG/L	076519 NITROGEN DISSOLVED N MG/L	076510 NITROGEN DISSOLVED N MG/L	09106L FLUORIDE DISSOLVED F MG/L	091061 FLUORIDE DISSOLVED F MG/L	091062 FLUORIDE DISSOLVED F MG/L
78-06-02	1200	324	.085	--	--	--	--	.068	--	--
78-07-26	1200	324	.096	.098	.096	.100	.110	.230	--	--
78-11-15	1000	324	.074	.074	.074	.074	.073	.082	--	--
79-05-02	1100	324	.110	.120	.100	.110	.110	.077 06R	.083	.075
79-06-05	1345	324	.086	.081	.081	.076	.081	.076 06R	.079	.077
79-07-04	0945	324	.096	.091	.096	.091	.096	.074 06R	.083	.072
84-03-29	1300	324	--	--	--	--	--	.074 06R	.073	.075

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	091063 FLUORIDE DISSOLVED F MG/L	091064 FLUORIDE DISSOLVED F MG/L	091065 FLUORIDE DISSOLVED F MG/L	091066 FLUORIDE DISSOLVED F MG/L	091067 FLUORIDE DISSOLVED F MG/L	091068 FLUORIDE DISSOLVED F MG/L	091069 FLUORIDE DISSOLVED F MG/L	091060 FLUORIDE DISSOLVED F MG/L
79-05-02	1100	324	.072	.069	.080	.076	.078	.075	.075	.082
79-06-05	1345	324	.077	.077	.075	.075	.075	.075	.074	.073
79-07-04	0945	324	.071	.070	.069	.068	.075	.076	.066	.089
84-03-29	1300	324	.073	--	--	--	--	--	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10101L ALKALINITY TOTAL CACO3 MG/L	101011 ALKALINITY TOTAL CACO3 MG/L	101012 ALKALINITY TOTAL CACO3 MG/L	101013 ALKALINITY TOTAL CACO3 MG/L	10151L ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101511 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101512 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L	101513 ALKALINITY PHENOL PHTHALEIN CACO3 MG/L
78-06-02	1200	324	61.4	--	--	--	.0	--	--	--
78-07-26	1200	324	63.5	--	--	--	.0	--	--	--
78-11-15	1000	324	78.2	--	--	--	.0	--	--	--
79-05-02	1100	324	65.9 01R	65.7	66.5	65.5	.0 51R	.0	.0	.0
79-06-05	1345	324	62.0 01R	62.0	61.8	62.1	.0 51R	.0	.0	.0
79-07-04	0945	324	70.2 01R	70.5	69.9	70.3	.0 51R	.0	.0	.0
84-03-29	1300	324	67.7 01R	67.7	67.9	67.5	.0 51R	.0	.0	.0

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	10301S PH	10301L PH	103011 PH	103012 PH	103013 PH	10401L RESIDUE NONFILTR.	104011 RESIDUE NONFILTR.	104012 RESIDUE NONFILTR.
			PH UNITS	PH UNITS	PH UNITS	PH UNITS	PH UNITS	MG/L	MG/L	MG/L
78-06-02	1200	324	--	7.9	--	--	--	18.	--	--
78-07-26	1200	324	--	8.0	--	--	--	3.	--	--
78-11-15	1000	324	--	8.0	--	--	--	2.	--	--
79-05-02	1100	324	8.2	8.0 01R	8.0	8.0	8.1	7. 01R	7.	7.
79-06-05	1345	324	8.6	7.9 01R	7.8	7.9	8.0	8. 01R	9.	9.
79-07-04	0945	324	--	8.0 01R	7.9	7.9	8.1	4. 01R	4.	3.
84-03-29	1300	324	--	8.2 01R	8.2	8.2	8.2	L10.	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	104013 RESIDUE NONFILTR.	10451L RESIDUE FILTERABLE	104511 RESIDUE FILTERABLE	104512 RESIDUE FILTERABLE	104513 RESIDUE FILTERABLE	10501L RESIDUE FIXED NONFILTR.	105011 RESIDUE FIXED NONFILTR.	105012 RESIDUE FIXED NONFILTR.
			MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
78-06-02	1200	324	--	107.	--	--	--	5.	--	--
78-07-26	1200	324	--	89.	--	--	--	L1.	--	--
78-11-15	1000	324	--	96.	--	--	--	1.	--	--
79-05-02	1100	324	8.	86. 51R	82.	91.	86.	5. 01R	5.	5.
79-06-05	1345	324	6.	91. 51R	88.	92.	92.	5. 01R	6.	5.
79-07-04	0945	324	6.	93. 51R	87.	93.	100.	3. 01R	3.	2.
84-03-29	1300	324	--	990.	--	--	--	L10.	--	--

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	105013 RESIDUE FIXED NONFILTR. MG/L	10551L RESIDUE FIXED FILTERABLE MG/L	105511 RESIDUE FIXED FILTERABLE MG/L	105512 RESIDUE FIXED FILTERABLE MG/L	105513 RESIDUE FIXED FILTERABLE MG/L	10603L HARDNESS TOTAL CACO3 MG/L	106031 HARDNESS TOTAL CACO3 MG/L	106032 HARDNESS TOTAL CACO3 MG/L
78-06-02	1200	324	--	81.	--	--	--	64.4	--	--
78-07-26	1200	324	--	47.	--	--	--	69.4	--	--
78-11-15	1000	324	--	74.	--	--	--	85.3	--	--
79-05-02	1100	324	6.	60. 51R	53.	61.	66.	69.8 03R	68.4	71.0
79-06-05	1345	324	5.	65. 51R	62.	67.	67.	67.3 03R	68.6	66.8
79-07-04	0945	324	4.	58. 51R	56.	64.	53.	73.6 03R	73.3	73.3
84-03-29	1300	324	--	960.	--	--	--	71.7 03R	71.9	71.9

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	106033 HARDNESS TOTAL CACO3 MG/L	11103L SODIUM DISSOLVED NA MG/L	111031 SODIUM DISSOLVED NA MG/L	111032 SODIUM DISSOLVED NA MG/L	111033 SODIUM DISSOLVED NA MG/L	12101L MAGNESIUM DISSOLVED (CALCD.) MG MG/L	121011 MAGNESIUM DISSOLVED (CALCD.) MG MG/L	121012 MAGNESIUM DISSOLVED (CALCD.) MG MG/L
78-06-02	1200	324	--	2.4	--	--	--	5.8	--	--
78-07-26	1200	324	--	1.2	--	--	--	5.1	--	--
78-11-15	1000	324	--	2.8	--	--	--	6.8	--	--
79-05-02	1100	324	70.0	2.3 03R	1.4	2.8	2.8	4.9 01R	4.8	5.0
79-06-05	1345	324	66.4	2.2 03R	2.2	2.1	2.2	4.8 01R	5.1	4.5
79-07-04	0945	324	74.3	2.3 03R	2.3	2.3	2.3	5.1 01R	5.0	4.9
84-03-29	1300	324	71.3	2.7 03R	2.7	2.7	2.7	4.7 01R	4.8	4.8

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	121013 MAGNESIUM DISSOLVED (CALCD.) MG MG/L	14105L SILICA REACTIVE SIO2 MG/L	141051 SILICA REACTIVE SIO2 MG/L	141052 SILICA REACTIVE SIO2 MG/L	141053 SILICA REACTIVE SIO2 MG/L	15102R PHOSPHORUS TOTAL DISSOLVED P MG/L	151021 PHOSPHORUS TOTAL DISSOLVED P MG/L	151022 PHOSPHORUS TOTAL DISSOLVED P MG/L
78-06-02	1200	324	--	7.1	--	--	--	.004	.004	.004
78-07-26	1200	324	--	5.6	--	--	--	.009	.010	.010
78-11-15	1000	324	--	6.6	--	--	--	.002	.005	.002
79-05-02	1100	324	5.0	7.1 05R	7.1	7.1	7.1	.002	.002	.002
79-06-05	1345	324	4.7	6.6 05R	6.6	6.6	6.7	.002	.002	.002
79-07-04	0945	324	5.3	6.7 05R	6.8	6.7	6.7	Q.002	.003	L.002
84-03-29	1300	324	4.6	9.0 05R	9.0	9.0	9.0	--	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	151023 PHOSPHORUS TOTAL DISSOLVED P MG/L	151024 PHOSPHORUS TOTAL DISSOLVED P MG/L	151025 PHOSPHORUS TOTAL DISSOLVED P MG/L	151026 PHOSPHORUS TOTAL DISSOLVED P MG/L	151027 PHOSPHORUS TOTAL DISSOLVED P MG/L	151028 PHOSPHORUS TOTAL DISSOLVED P MG/L	151029 PHOSPHORUS TOTAL DISSOLVED P MG/L	151020 PHOSPHORUS TOTAL DISSOLVED P MG/L
78-06-02	1200	324	.004	.004	.004	.004	--	--	--	--
78-07-26	1200	324	.008	.008	.011	.007	.006	.009	.012	.009
78-11-15	1000	324	.002	.002	.002	.002	.002	.002	.002	.002
79-05-02	1100	324	.002	.002	.002	--	--	--	--	--
79-06-05	1345	324	.002	.002	.002	--	--	--	--	--
79-07-04	0945	324	.002	.003	.002	--	--	--	--	--

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	15406R PHOSPHORUS TOTAL P MG/L	154061 PHOSPHORUS TOTAL P MG/L	154062 PHOSPHORUS TOTAL P MG/L	154063 PHOSPHORUS TOTAL P MG/L	154064 PHOSPHORUS TOTAL P MG/L	154065 PHOSPHORUS TOTAL P MG/L	154066 PHOSPHORUS TOTAL P MG/L	154067 PHOSPHORUS TOTAL P MG/L
78-06-02	1200	324	.021	.020	.021	.020	.021	.020	.022	--
78-07-26	1200	324	.020	.023	.021	.016	.019	.026	.018	.018
78-11-15	1000	324	.006	.006	.006	.006	.006	.006	.006	.006
79-05-02	1100	324	.017	.018	.018	.017	.018	.017	.017	.018
79-06-05	1345	324	.018	.025	.016	.015	.016	.015	.018	.019
79-07-04	0945	324	.019	.066	.014	.013	.013	.013	.013	.013

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	154068 PHOSPHORUS TOTAL P MG/L	154069 PHOSPHORUS TOTAL P MG/L	154060 PHOSPHORUS TOTAL P MG/L	16306L SULPHATE DISSOLVED SO4 MG/L	163061 SULPHATE DISSOLVED SO4 MG/L	163062 SULPHATE DISSOLVED SO4 MG/L	163063 SULPHATE DISSOLVED SO4 MG/L	163064 SULPHATE DISSOLVED SO4 MG/L
78-06-02	1200	324	--	--	--	8.2	--	--	--	--
78-07-26	1200	324	.018	.019	.020	8.4	--	--	--	--
78-11-15	1000	324	.006	.006	.006	9.7	--	--	--	--
79-05-02	1100	324	.016	.018	.016	7.9 06R	8.0	7.9	7.9	7.9
79-06-05	1345	324	.017	.017	.018	6.9 06R	7.2	7.0	6.9	6.9
79-07-04	0945	324	.013	.014	.013	6.2 06R	6.3	6.1	6.1	6.1
84-03-29	1300	324	--	--	--	6.1 06R	5.2	6.0	6.2	--

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029 PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	163065 SULPHATE DISSOLVED SO4 MG/L	163066 SULPHATE DISSOLVED SO4 MG/L	163067 SULPHATE DISSOLVED SO4 MG/L	163068 SULPHATE DISSOLVED SO4 MG/L	163069 SULPHATE DISSOLVED SO4 MG/L	163060 SULPHATE DISSOLVED SO4 MG/L	17206L CHLORIDE DISSOLVED CL MG/L	172061 CHLORIDE DISSOLVED CL MG/L
78-06-02	1200	324	--	--	--	--	--	--	.7	--
78-07-26	1200	324	--	--	--	--	--	--	.8	--
78-11-15	1000	324	--	--	--	--	--	--	.9	--
79-05-02	1100	324	7.9	7.9	7.9	7.8	7.9	8.0	.7 06R	.7
79-06-05	1345	324	7.0	7.0	6.8	6.8	6.9	6.8	.8 06R	.8
79-07-04	0945	324	6.1	6.1	6.4	6.2	6.1	6.1	.8 06R	.8
84-03-29	1300	324	--	--	--	--	--	--	.8 06R	.9

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	172062 CHLORIDE DISSOLVED CL MG/L	172063 CHLORIDE DISSOLVED CL MG/L	19103L POTASSIUM DISSOLVED K MG/L	191031 POTASSIUM DISSOLVED K MG/L	191032 POTASSIUM DISSOLVED K MG/L	191033 POTASSIUM DISSOLVED K MG/L	20101L CALCIUM DISSOLVED CA MG/L	201011 CALCIUM DISSOLVED CA MG/L
78-06-02	1200	324	--	--	.7	--	--	--	16.2	--
78-07-26	1200	324	--	--	.7	--	--	--	19.4	--
78-11-15	1000	324	--	--	.6	--	--	--	23.0	--
79-05-02	1100	324	.7	.7	.6 03R	.5	.7	.6	19.5 01R	19.1
79-06-05	1345	324	.8	.9	.6 03R	.6	.6	.6	19.3 01R	17.2
79-07-04	0945	324	.8	.8	.6 03R	.6	.6	.6	22.1 01R	21.5
84-03-29	1300	324	.8	.8	.9 03R	.9	.9	.9	20.9 01R	20.8

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	201012 CALCIUM DISSOLVED CA MG/L	201013 CALCIUM DISSOLVED CA MG/L	201014 CALCIUM DISSOLVED CA MG/L	201015 CALCIUM DISSOLVED CA MG/L	201016 CALCIUM DISSOLVED CA MG/L	201017 CALCIUM DISSOLVED CA MG/L	201018 CALCIUM DISSOLVED CA MG/L	201019 CALCIUM DISSOLVED CA MG/L
79-05-02	1100	324	19.3	19.3	19.9	19.5	20.1	19.5	19.5	19.5
79-06-05	1345	324	18.7	18.5	18.7	20.3	19.9	19.9	19.3	20.3
79-07-04	0945	324	20.9	22.0	21.9	21.3	21.0	21.6	22.0	26.6
84-03-29	1300	324	20.9	21.0	--	--	--	--	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	201010 CALCIUM DISSOLVED CA MG/L	25004P MANGANESE TOTAL MN MG/L	250041 MANGANESE TOTAL MN MG/L	250042 MANGANESE TOTAL MN MG/L	250043 MANGANESE TOTAL MN MG/L	250044 MANGANESE TOTAL MN MG/L	250045 MANGANESE TOTAL MN MG/L	250046 MANGANESE TOTAL MN MG/L
78-06-02	1200	324	--	.02	--	--	--	--	--	--
78-07-26	1200	324	--	.01 04R	.01	.01	.01	.01	.01	.01
78-11-15	1000	324	--	L.01 04R	L.01	L.01	L.01	L.01	L.01	L.01
79-05-02	1100	324	19.7	.02 04R	.01	.01	.03	.03	.01	.01
79-06-05	1345	324	19.9	.01 04R	.01	.01	.02	.01	.01	.01
79-07-04	0945	324	22.3	L.01 04R	L.01	L.01	L.01	L.01	L.01	L.01
84-03-29	1300	324	--	.02 04R	.02	.02	.01	--	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	250047 MANGANESE TOTAL MN MG/L	250048 MANGANESE TOTAL MN MG/L	250049 MANGANESE TOTAL MN MG/L	250040 MANGANESE TOTAL MN MG/L	25104P MANGANESE DISSOLVED MN MG/L	251041 MANGANESE DISSOLVED MN MG/L	251042 MANGANESE DISSOLVED MN MG/L	251043 MANGANESE DISSOLVED MN MG/L
78-06-02	1200	324	--	--	--	--	L.01	--	--	--
78-07-26	1200	324	.01	.01	.01	.01	--	--	--	--
78-11-15	1000	324	L.01	L.01	L.01	L.01	--	--	--	--
79-05-02	1100	324	.02	.02	.02	.02	--	--	--	--
79-06-05	1345	324	.01	.01	.01	.01	--	--	--	--
79-07-04	0945	324	L.01	L.01	L.01	L.01	--	--	--	--
84-03-29	1300	324	--	--	--	--	L.01 04R	L.01	L.01	L.01

FOOTNOTE: L - LESS THAN DETECTION LIMIT G - GREATER THAN MEASUREMENT LIMIT
NOTEZ BIEN: L - PLUS PETIT QUE LA LIMITE DE DETECTION G - PLUS GRAND QUE LA LIMITE MESURE

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029 LAT. 49D 0M 11S LONG. 117D 37M 0S
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	25304P MANGANESE EXTRBLE. MN MG/L	26004P IRON TOTAL FE MG/L	260041 IRON TOTAL FE MG/L	260042 IRON TOTAL FE MG/L	260043 IRON TOTAL FE MG/L	260044 IRON TOTAL FE MG/L	260045 IRON TOTAL FE MG/L	260046 IRON TOTAL FE MG/L
78-06-02	1200	324	.02	.37	--	--	--	--	--	--
78-07-26	1200	324	--	.18 04R	.14	.17	.13	.13	.21	.17
78-11-15	1000	324	--	.08 04R	.07	.07	.07	.10	.08	.06
79-05-02	1100	324	--	.19 04R	.20	.18	.20	.18	.19	.19
79-06-05	1345	324	--	.13 04R	.14	.13	.13	.13	.13	.14
79-07-04	0945	324	--	.10 04R	.09	.10	.10	.11	.10	.12
84-03-29	1300	324	--	.29 04R	.28	.32	.28	--	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	260047 IRON TOTAL FE MG/L	260048 IRON TOTAL FE MG/L	260049 IRON TOTAL FE MG/L	260040 IRON TOTAL FE MG/L	26105P IRON DISSOLVED FE MG/L	261041 IRON DISSOLVED FE MG/L	261052 IRON DISSOLVED FE MG/L	261053 IRON DISSOLVED FE MG/L
78-06-02	1200	324	--	--	--	--	.013	--	--	--
78-07-26	1200	324	.15	.33	.13	.19	--	--	--	--
78-11-15	1000	324	.07	.10	.07	.08	--	--	--	--
79-05-02	1100	324	.18	.21	.19	.18	--	--	--	--
79-06-05	1345	324	.14	.13	.14	.13	--	--	--	--
79-07-04	0945	324	.11	.09	.08	.08	--	--	--	--
84-03-29	1300	324	--	--	--	--	.032 05R	.06	.034	.030

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	26304P IRON EXTRBLE. FE MG/L	28002P NICKEL TOTAL NI MG/L	280021 NICKEL TOTAL NI MG/L	280022 NICKEL TOTAL NI MG/L	280023 NICKEL TOTAL NI MG/L	280024 NICKEL TOTAL NI MG/L	280025 NICKEL TOTAL NI MG/L	280026 NICKEL TOTAL NI MG/L
78-06-02	1200	324	.14	L.001	--	--	--	--	--	--
78-07-26	1200	324	--	Q.005 02R	.001	L.001	.005	.001	L.001	.031
78-11-15	1000	324	--	Q.002 02R	.002	L.001	.002	.002	L.001	.002
79-05-02	1100	324	--	L.001 02R	L.001	L.001	L.001	L.001	L.001	L.001
79-06-05	1345	324	--	Q.001 02R	L.001	L.001	.001	L.001	.001	L.001
79-07-04	0945	324	--	Q.001 02R	L.001	L.001	L.001	.001	.001	L.001

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	280027 NICKEL TOTAL NI MG/L	280028 NICKEL TOTAL NI MG/L	280029 NICKEL TOTAL NI MG/L	280020 NICKEL TOTAL NI MG/L	28102P NICKEL DISSOLVED NI MG/L	28302P NICKEL EXTRBLE. NI MG/L	29005P COPPER TOTAL CU MG/L	290051 COPPER TOTAL CU MG/L
78-06-02	1200	324	--	--	--	--	L.001	.001	.004	--
78-07-26	1200	324	.002	.002	.002	.002	--	--	.005 05R	.004
78-11-15	1000	324	.002	.001	L.001	.001	--	--	.003 05R	.004
79-05-02	1100	324	L.001	L.001	L.001	L.001	--	--	Q.002 05R	.001
79-06-05	1345	324	L.001	L.001	L.001	L.001	--	--	.004 05R	.009
79-07-04	0945	324	L.001	L.001	.001	.001	--	--	.002 05R	.002
84-03-29	1300	324	--	--	--	--	--	--	.003 05R	.002

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	290052 COPPER TOTAL CU MG/L	290053 COPPER TOTAL CU MG/L	290054 COPPER TOTAL CU MG/L	290055 COPPER TOTAL CU MG/L	290056 COPPER TOTAL CU MG/L	290057 COPPER TOTAL CU MG/L	290058 COPPER TOTAL CU MG/L	290059 COPPER TOTAL CU MG/L
78-07-26	1200	324	.005	.006	.006	.004	.02 066	.005	.005	.005
78-11-15	1000	324	.002	.002	.004	.002	.003	.002	.005	.003
79-05-02	1100	324	.002	L.001	L.001	.001	.003	.002	.002	.001
79-06-05	1345	324	.003	.003	.003	.003	.004	.008	.003	.004
79-07-04	0945	324	.001	.002	.001	.002	.003	.002	.002	.002
84-03-29	1300	324	.004	.003	--	--	--	--	--	--

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029 LAT. 49D 0M 11S LONG. 117D 37M 0S
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	290050 COPPER TOTAL CU MG/L	29105P COPPER DISSOLVED CU MG/L	291051 COPPER DISSOLVED CU MG/L	291052 COPPER DISSOLVED CU MG/L	291053 COPPER DISSOLVED CU MG/L	29305P COPPER EXTRBLE. CU MG/L	30005P ZINC TOTAL ZN MG/L	300051 ZINC TOTAL ZN MG/L
78-06-02	1200	324	--	.005	--	--	--	.002	.004	--
78-07-26	1200	324	.004	--	--	--	--	--	.02 04R	.02 041
78-11-15	1000	324	.003	--	--	--	--	--	.004 05R	.003
79-05-02	1100	324	L.001	--	--	--	--	--	.002 05R	.002
79-06-05	1345	324	.005	--	--	--	--	--	.002 05R	.004
79-07-04	0945	324	.003	--	--	--	--	--	Q.001 05R	L.001
84-03-29	1300	324	--	.002 05R	.002	.001	.002	--	.004 05R	.004

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	300052 ZINC TOTAL ZN MG/L	300053 ZINC TOTAL ZN MG/L	300054 ZINC TOTAL ZN MG/L	300055 ZINC TOTAL ZN MG/L	300056 ZINC TOTAL ZN MG/L	300057 ZINC TOTAL ZN MG/L	300058 ZINC TOTAL ZN MG/L	300059 ZINC TOTAL ZN MG/L
78-07-26	1200	324	.02 042	.01 043	.02 044	.02 045	.01 046	.01 047	.02 048	.02 049
78-11-15	1000	324	.003	.005	.007	.003	.003	.003	.003	.003
79-05-02	1100	324	.001	.001	.002	.001	.004	.002	.003	.001
79-06-05	1345	324	.003	.002	.001	.002	.003	.002	.001	.002
79-07-04	0945	324	L.001	.001	.001	L.001	L.001	L.001	.001	.003
84-03-29	1300	324	.004	.004	--	--	--	--	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	300050 ZINC TOTAL ZN MG/L	30105P ZINC DISSOLVED ZN MG/L	301051 ZINC DISSOLVED ZN MG/L	301052 ZINC DISSOLVED ZN MG/L	301053 ZINC DISSOLVED ZN MG/L	30305P ZINC EXTRBLE. ZN MG/L	33010L ARSENIC TOTAL AS MG/L	33104L ARSENIC DISSOLVED AS MG/L
78-06-02	1200	324	--	.002	--	--	--	.005	.0006	.0005
78-07-26	1200	324	.02 040	--	--	--	--	--	--	--
78-11-15	1000	324	.003	--	--	--	--	--	--	--
79-05-02	1100	324	.002	--	--	--	--	--	--	--
79-06-05	1345	324	.002	--	--	--	--	--	--	--
79-07-04	0945	324	.001	--	--	--	--	--	--	--
84-03-29	1300	324	--	.002 05R	.002	.002	.002	--	--	--

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	33304R ARSENIC EXTRBLE. AS MG/L	333041 ARSENIC EXTRBLE. AS MG/L	333042 ARSENIC EXTRBLE. AS MG/L	333043 ARSENIC EXTRBLE. AS MG/L	34010L SELENIUM TOTAL SE MG/L	34102L SELENIUM DISSOLVED SE MG/L	34302R SELENIUM EXTRBLE. SE MG/L	343021 SELENIUM EXTRBLE. SE MG/L
78-06-02	1200	324	--	--	--	--	.0001	L.0001	--	--
79-05-02	1100	324	.0006	.0006	.0006	.0006	--	--	L.0001	L.0001
79-06-05	1345	324	.0009	.0008	.0009	.0010	--	--	L.0001	L.0001
79-07-04	0945	324	.0007	.0007	.0007	.0007	--	--	Q.0001	.0001
84-03-29	1300	324	.0006	.0006	.0006	.0006	--	--	L.0001	L.0001

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	343022 SELENIUM EXTRBLE. SE MG/L	343023 SELENIUM EXTRBLE. SE MG/L	47002P SILVER TOTAL AG MG/L	47102P SILVER DISSOLVED AG MG/L	47302P SILVER EXTRBLE. AG MG/L	48002R CADMIUM TOTAL CD MG/L	480021 CADMIUM TOTAL CD MG/L	480022 CADMIUM TOTAL CD MG/L
78-06-02	1200	324	--	--	L.005	L.005	L.005	--	--	--
78-11-15	1000	324	--	--	--	--	--	L.0005	L.0005	L.0005
79-05-02	1100	324	L.0001	L.0001	--	--	--	L.0005	L.0005	L.0005
79-06-05	1345	324	L.0001	L.0001	--	--	--	L.0005	L.0005	L.0005
79-07-04	0945	324	L.0001	L.0001	--	--	--	L.0005	L.0005	L.0005
84-03-29	1300	324	L.0001	L.0001	--	--	--	L.0005	L.0005	L.0005

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	480023 CADMIUM TOTAL CD MG/L	480024 CADMIUM TOTAL CD MG/L	480025 CADMIUM TOTAL CD MG/L	480026 CADMIUM TOTAL CD MG/L	480027 CADMIUM TOTAL CD MG/L	480028 CADMIUM TOTAL CD MG/L	480029 CADMIUM TOTAL CD MG/L	480020 CADMIUM TOTAL CD MG/L
78-11-15	1000	324	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
79-05-02	1100	324	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
79-06-05	1345	324	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
79-07-04	0945	324	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005	L.0005
84-03-29	1300	324	L.0005	--	--	--	--	--	--	--

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	48102R CADMIUM DISSOLVED CD MG/L	481021 CADMIUM DISSOLVED CD MG/L	481022 CADMIUM DISSOLVED CD MG/L	481023 CADMIUM DISSOLVED CD MG/L	51004L ANTIMONY TOTAL SB MG/L	51104L ANTIMONY DISSOLVED SB MG/L	56001L BARIUM TOTAL BA MG/L	56101L BARIUM DISSOLVED BA MG/L
78-06-02	1200	324	--	--	--	--	L.001	L.0010	L.1	.1
84-03-29	1300	324	L.001	L.001	L.001	L.001	--	--	--	--

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	80011P MERCURY TOTAL HG UG/L	80111P MERCURY DISSOLVED HG UG/L	80311R MERCURY EXTRBLE. HG UG/L	803111 MERCURY EXTRBLE. HG UG/L	803112 MERCURY EXTRBLE. HG UG/L	803113 MERCURY EXTRBLE. HG UG/L	82002P LEAD TOTAL PB MG/L	820021 LEAD TOTAL PB MG/L
78-06-02	1200	324	L.05	L.05	--	--	--	--	L.001	--
78-07-26	1200	324	--	--	--	--	--	--	.008 02R	.009
78-11-15	1000	324	--	--	L.05	L.05	L.05	L.05	Q.002 02R	.002
79-05-02	1100	324	--	--	L.05	L.05	L.05	L.05	Q.001 02R	.001
79-06-05	1345	324	--	--	L.05	L.05	L.05	L.05	Q.002 02R	L.001
79-07-04	0945	324	--	--	L.05	L.05	L.05	L.05	L.001 02R	L.001
84-03-29	1300	324	--	--	L.05	L.05	L.05	L.05	Q.001 02R	L.001

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	820022 LEAD TOTAL PB MG/L	820023 LEAD TOTAL PB MG/L	820024 LEAD TOTAL PB MG/L	820025 LEAD TOTAL PB MG/L	820026 LEAD TOTAL PB MG/L	820027 LEAD TOTAL PB MG/L	820028 LEAD TOTAL PB MG/L	820029 LEAD TOTAL PB MG/L
78-07-26	1200	324	.008	.008	.008	.008	.008	.007	.007	.009
78-11-15	1000	324	.001	.002	.003	.001	.003	.002	L.001	.001
79-05-02	1100	324	L.001	L.001	L.001	L.001	L.001	.001	L.001	L.001
79-06-05	1345	324	.002	.002	.001	.001	.002	.003	.002	.002
79-07-04	0945	324	L.001	L.001	L.001	L.001	L.001	L.001	L.001	L.001
84-03-29	1300	324	.001	L.001	--	--	--	--	--	--

NAQUADAT
DETAILED REPORT / RAPPORT DETAILLE

STATION - 00BC08NE0029
PEND D'OREILLE RIVER BELOW WANETA POWER DAM AT RAILWAY BRIDGE, LAT. 49D 0M 11S LONG. 117D 37M 0S
BRITISH COLUMBIA

DATE YMD/AMJ	TIME/ HEURE	SUB-ID/ SOUS-ID	820020 LEAD TOTAL PB MG/L	82103P LEAD DISSOLVED PB MG/L	821031 LEAD DISSOLVED PB MG/L	821032 LEAD DISSOLVED PB MG/L	821033 LEAD DISSOLVED PB MG/L	82302P LEAD EXTRBLE. PB MG/L
78-06-02	1200	324	--	L.001	--	--	--	.002
78-07-26	1200	324	.009	--	--	--	--	--
78-11-15	1000	324	.003	--	--	--	--	--
79-05-02	1100	324	L.001	--	--	--	--	--
79-06-05	1345	324	.002	--	--	--	--	--
79-07-04	0945	324	L.001	--	--	--	--	--
84-03-29	1300	324	--	--	.001	.001	.001	--

FOOTNOTE: L - LESS THAN DETECTION LIMIT G - GREATER THAN MEASUREMENT LIMIT
NOTEZ BIEN: L - PLUS PETIT QUE LA LIMITE DE DETECTION G - PLUS GRAND QUE LA LIMITE MESURE

Section 5

Miscellaneous Studies

RADIOACTIVITY IN THE COLUMBIA RIVER

In November, 1978, samples were taken for measurements of radioactivity. Concerns about radioactivity had been raised primarily because of uranium exploration near Genelle, B.C. (Figure 1). In addition, the phosphate rock used in the fertilizer operation at Cominco was considered a possible source of radioactivity.

Three 4-gal (18-l) samples of water were collected at Waneta and shipped to the Canada Centre for Inland Waters where they were analyzed for ^{226}radium. Since radioactive shales were known to exist in the Pend d'Oreille watershed (Marjaniemi and Robins 1975), two additional samples were collected at the Pend d'Oreille station.

Table 38

^{226}Radium counts (pCi/L) measured in water collected from the Columbia River at Waneta and the Pend d'Oreille River on November 16, 1978. Values reported are means and standard deviations determined from counting statistics.

Sample Site	Counts	
	Mean	S.D.
Pend d'Oreille	.04	.01
Pend d'Oreille	.06	.01
Columbia	.08	.01
Columbia	.38	.03
Columbia	.26	.02

References

Inland Waters Directorate, Water Quality Branch. 1979. Analytical methods manual. Available from: Water Quality Branch, Ottawa.

Inland Waters Directorate, Water Quality Branch. 1986. NAQUADAT dictionary of parameter codes. Available from: Data Systems Section, Water Quality Branch, Ottawa.

Marjaniemi, D.K. and J.W. Robins. 1975. Uranium favorability of tertiary sedimentary rocks of the Pend Oreille River Valley, Washington. Pitkin (Lucius), Inc., Grand Junction, Colo.

Terzi, R.A. 1981. Hydrometric field manual-Measurement of stream flow. Available from: Water Resources Branch, Ottawa.

Thorp, A.C. 1978. A system for field filtration of water samples using compressed air. Available from: Water Quality Branch, Vancouver, B.C.

Whitfield, P.H. 1984. Operation of the "Hydrolab" 8000 system for collection of water quality data. Available from: Water Quality Branch, Vancouver, B.C.